To balance people's interaction with the environment to protect human health and ecosystem integrity.

Drinking Water Compliance Report 2001

April 1, 2000 to March 31, 2001

Environmental Protection Branch
Room 224 - 3211 Albert Street
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SERM

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EXECUTIVE SUMMARY

Environmental Protection Branch (EPB) reviewed the compliance of Saskatchewan's water system owners and operators under SERM's legislated jurisdiction with drinking water quality monitoring requirements for the fiscal period 2000/2001. Compliance with sampling and with drinking water quality objectives is also compared to an earlier 1999/2000 Drinking Water Compliance Report and is summarized as follows :

Turbidity

Seventy-nine percent of the turbidity analysis results submitted by municipal water treatment facilities complied with the drinking water quality objective of 1 NTU (nephelometric turbidity units), however, this only represents a 91% facility compliance rate during the 2000/2001 fiscal year. In comparison, eighty percent of municipal turbidity results complied with the turbidity objective of 1 NTU, with a 54% facility compliance rate during the 1999/2000 fiscal period. In 1994/95 less than two thirds of facilities had the required testing equipment to monitor this parameter. Information is not available on the current status of municipal owned turbidity monitoring equipment for this parameter.

Free Chlorine

During the 2000/2001 fiscal period, ninety percent of regulated water treatment facilities complied with the testing requirement, and 85% maintained the minimum free chlorine residual required by regulation. In comparison, during the 1999/2000 fiscal year, seventy-nine percent of municipalities complied with this testing requirement, and 56 % maintained the minimum free chlorine residuals required by regulation.

Total Chlorine

During the 2000/2001 fiscal period, eighty-nine percent of regulated water treatment facilities complied with the testing requirement, and 73% maintained the minimum total chlorine residual required by regulation. In comparison, during the 1999/2000 fiscal year, seventy-two percent of municipalities complied with testing requirement, and 24% maintained the minimum total chlorine residuals required by regulation.

Microbiological

Regular Samples:

During the 2000/2001 fiscal year, over ninety percent of the regular bacteriological samples required from waterworks licensed by SERM were submitted; 32% of those waterworks which submitted samples met bacteriological objectives. Over 29% of the facilities which submitted samples had more than 10% of their samples which did not meet Municipal Drinking Water Quality Objectives.

During the 1999/2000 fiscal year, seventy-five percent of the regular bacteriological samples required from waterworks licensed by SERM were submitted; 42% of those waterworks which submitted samples met bacteriological objectives. Over 32% of the facilities which submitted samples had more than 10% of their samples which did not meet Municipal Drinking Water Quality Objectives.

Repeat Samples:
During the 2000/2001 fiscal period, eighty-nine percent of the required repeat samples were submitted by SERM licenced waterworks; 77.3 %of the results met objectives. In the 1999/2000 fiscal year, thirty-five percent of the required repeat samples were submitted by municipalities; 72% of the results met objectives.

Special Samples:
During the 2000/2001 fiscal year, **one hundred and thirty-five** percent of the required special samples were submitted by SERM licenced waterworks; 73.9 %of the results met objectives. In the 1999/2000 fiscal period, **twenty-two** percent of the required special samples were submitted by municipalities; 90% of the results met objectives.

Trihalomethanes (THMs)
For the 2000/2001 fiscal year seventy-nine percent (136 out of 171) of SERM licenced waterworks submitted at least some of the required THM samples; 118 out of 136 municipalities (84 %) submitted all of the required seasonal samples; 63 out of 136 municipalities met the provincial quality objective of less than 100 micrograms per litre (ug/L) for THMs.

For the 1999/2000 fiscal year eighty-five percent (142 out of 167) of SERM licenced waterworks submitted at least some of the required THM samples; 85 out of 142 municipalities (60%) submitted all of the required seasonal samples; 91 out of 142 municipalities met the provincial quality objective of less than 100 micrograms per litre (ug/L) for THMs.

Health and Toxicity Related Chemicals
During the 2000/2001 fiscal year, **thirty** percent of SERM licenced waterworks submitted health and toxicity samples; 95% of these waterworks met the drinking water quality objectives for health and toxicity related chemicals. In comparison, **twenty-eight** percent of municipalities submitted samples; 82% of these municipalities met the drinking water quality objectives for health and toxicity related chemicals during the 1999/2000 fiscal year.

Pesticides
During the 2000/2001 fiscal year, **fifty-four** percent of municipalities complied with the pesticide sampling requirements and all submitted samples met provincial objectives.
In comparison, **sixty-four** percent of municipalities complied with the pesticide sampling requirement during the 1999/2000 fiscal year and all submitted samples met provincial objectives.

Total Dissolved Solids (TDS)
During the 2000/2001 fiscal year, **thirty-five** percent of SERM licenced waterworks submitted the required TDS samples; 76% of these facilities met the provincial objective for TDS. In the 1999/2000 fiscal year, **forty** percent of municipalities submitted the required samples; 82% of the samples submitted by these facilities met the provincial objective for TDS.

Operator Certification

Thirty-two percent of provincial operators complied with the province's combined Voluntary and Mandatory Operator Certification Program during the 2000/2001 fiscal year. This surpassed the 1999/2000 participation rate by 3%.

There is significant room for improvement in the submission of the required drinking water samples, and the completion of the required testing by facility owners and operators in Saskatchewan.

There is a real need for municipalities, private and government waterworks to take action to improve their drinking water quality by:

- reducing and responding to bacteriological contamination;
- maintaining adequate chlorine residuals for disinfection;
- trihalomethane reduction; and
- turbidity removal.

There is also a critical need for more participation by the province's operators to take training and become certified.

This third Drinking Water Compliance Report follows the 1999/2000 Drinking Water Compliance Report and is intended as an ongoing series of reports planned by Saskatchewan Environment and Resource Management (SERM) to provide information to the Saskatchewan public about the quality of their drinking water supplies.

This report provides an overview of compliance with provincial legislative and regulatory(1) requirements, and with Saskatchewan's Municipal Drinking Water Quality Objectives for the 2000/2001 fiscal year. It is important to note that Saskatchewan does not have legislated drinking water quality standards. The province uses a risk management approach in cases where analytical results of drinking water sampling exceed Municipal Drinking Water Quality Objectives.

1.0 Regulation of Works

1.1 Legislation and Mandate

SERM's mandate for regulating the treatment and distribution of potable water comes from the *Environmental Management and Protection Act* (EMPA)[2]. EMPA refers to the protection of the environment, and also to the protection of **public health**.

EMPA defines waterworks in this way: "Waterworks means any works for the supply, collection, treatment, storage or distribution of water for potable use or for delivery to residential property." (NOTE: "potable water" is defined in the Waterworks Regulations as "water that is approved for human consumption".)

Pertinent sections of EMPA include:

Section 38(1) "The Lieutenant Governor in Council may make regulations:

(e) prescribing standards and authorizing the minister to prescribe standards for the design, construction, installation, alteration, extension, operation and monitoring of industrial effluent works, sewage works, and waterworks where those standards are required for the protection of the environment or the public health:

(f) respecting the training and qualifications of operators of industrial effluent works, waterworks and sewage works;"

These provisions provide the authority for SERM to regulate all municipal water systems, and all private and government water systems utilizing capacities greater than 18 cubic metres per day.

The scope of this report includes a data evaluation for selected drinking water parameters at municipal, private and/or government water systems regulated by SERM, for the period of April 1, 2000 to March 31, 2001 inclusive. Small private and government works with capacities of less than 18 cubic metres per day are regulated by Saskatchewan Health, and are therefore not included in this evaluation.

SERM publishes several drinking water related materials, including: *Municipal Drinking Water Quality Objectives*[3], *A Guide to Waterworks Design*[4], *Municipal Drinking Water Quality Monitoring Guidelines*[5], *Surface Water Quality Objectives*[6], *Water/Wastewater Facilities - Facility Classification and Operator Certification*[7], *Turbidity Measurement*[8], *Guidelines for Chlorine Gas Use in Water and Wastewater Treatment*[9], *Reservoir Management*[10], and *A Guide to Aquatic Nuisances and Their Control*[11].

1.2 Number and Classification of Works Regulated

The breakdown of the province's water treatment and distribution works into their classifications are shown in Tables 1-1 and 1-2 respectively. Class 1 is the simplest, with class 4 being the most complex. Information is from SERM's WINDAT database[12].

Table 1-1 - Water Treatment Works

	WT-1*	WT-2	WT-3	WT-4
Municipal	370	129	15	4
Private	11	1	0	0
Government	12	3	0	0
Total:	393	133	15	4

Table 1-2 - Water Distribution Works

	WD-1**	WD-2	WD-3	WD-4
Municipal	505	36	5	2
Private	5	0	0	0
Government	7	0	0	0
Total:	517	36	5	2

* WT - Water Treatment

** WD - Water Distribution

In fiscal year 2000/2001 Saskatchewan had 518 municipal, 12 private and 15 government water treatment works falling under SERM's legislation, for a total of 545 regulated water treatment works. An additional 49 municipal, private and government waterworks are classified as distribution only as they are receiving water from a licensed water treatment facility for a total of 594 regulated waterworks[12].

2.0 Microbiological

2.1 General Introduction

To protect the health and safety of Saskatchewan consumers, SERM requires the owners and operators of water systems to regularly test for indicator bacteria in treated drinking water.

These indicator bacteria are total coliforms and fecal coliforms. During the total coliform test, the confluent growth of background bacteria sometimes masks or suppresses the growth of coliforms. High levels of background bacteria should be absent in properly treated and safe drinking water. Therefore background bacteria are also monitored and included in SERM's follow up system for bacterial contamination. SERM does not require routine monitoring for general bacterial populations in drinking water, such as heterotrophic bacteria.

Saskatchewan's "Maximum Acceptable Concentrations" (MACs) for bacteria in drinking water are:

Total Coliforms:	Less than 1 organism per 100 mL of sample.
Fecal Coliforms:	Less than 1 organism per 100 mL of sample.
Background Bacteria:	Less than 200 organisms per 100 mL of sample.
Heterotrophic Bacteria:	Less than 50,000 organisms per 100 mL of sample.

Provincial bacteriological sample submission guidelines$_{(5)}$ are shown in Table 2-1.

Table 2-1 - Bacteriological Sampling Guidelines

POPULATION	GROUNDWATER SOURCE	SURFACE WATER AND BLENDED SOURCE
0 - 100	1 per 4 weeks	1 per 2 weeks
101 - 500	1 per 2 weeks	1 per week
501 - 5,000	1 per week	1 per week
5,001 - 100,000	1 per 2,000 population per 4 weeks	1 per 1,000 population per 4 weeks
Greater Than 100,000	1 per 4,000 population per 4 weeks	1 per 3,000 population per 4 weeks

2.2 Turbidity

Turbidity is an indirect measure of particles in drinking water. These particles may harbour disease causing bacteria or protozoa, they may add to cloudiness or impart colour, they may result in the production of disinfection byproducts, or they may interfere with disinfection efficiency in water treatment.

Turbidity is an important process control parameter, especially in surface water treatment.

Table 2-2 outlines monitoring guidelines for turbidity[(5)].

Table 2-2 - Turbidity Monitoring Guidelines

POPULATION	GROUNDWATER SOURCE	SURFACE WATER AND BLENDED SOURCE
0 - 100	None	1 per day
101 - 500	None	1 per day
501 - 5,000	None	1 per day
5,001 - 100,000	1 per day	Continuous
Greater than 100,000	Continuous	Continuous

SERM does not require municipalities to submit routine turbidity monitoring results, however, on-site monitoring for turbidity and record keeping is required for those works identified in table 2-2. These records are checked during site inspections by SERM's Environment Officers.

Because of the potential health and safety implications of drinking water containing high turbidity, Saskatchewan has adopted the Canadian guideline[(14)] for turbidity. The MAC for turbidity in drinking water is 1.0 NTU (nephelometric turbidity units).

The Aesthetic Objective (AO) for turbidity is 5.0 NTU. At this turbidity level the cloudiness of a water sample becomes visually apparent. A turbidity of 5 NTU may be acceptable if the water system owner can demonstrate that this higher turbidity does not interfere with disinfection of the drinking water. SERM acknowledges that the turbidity MAC of 1.0 NTU may occasionally be exceeded, and that minor, infrequent excursions do not necessarily compromise drinking water safety.

Figure 2-1 - Turbidity Compliance Chart

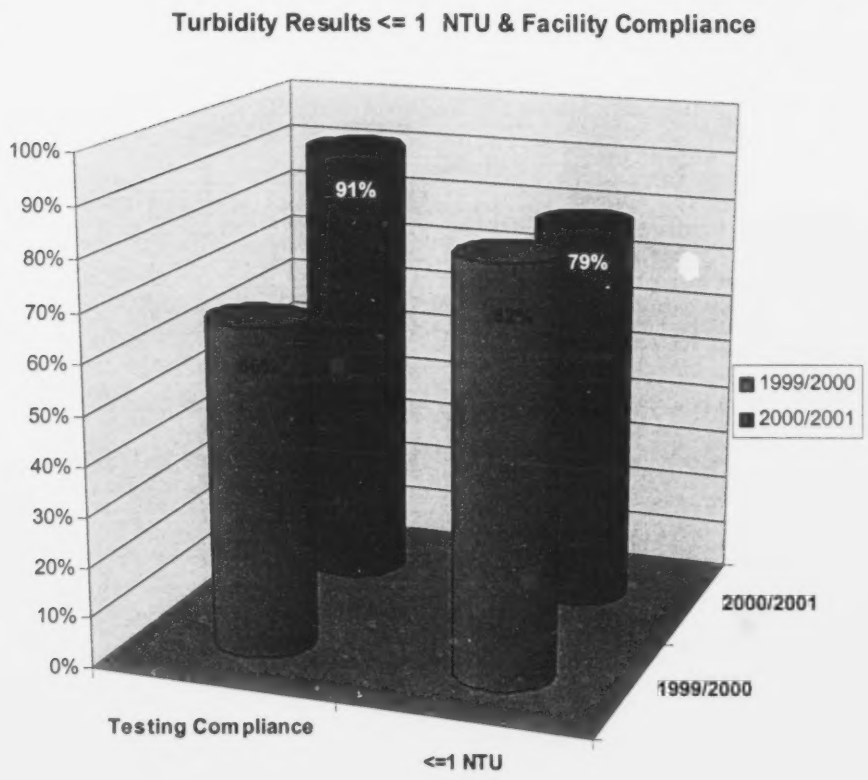


Figure 2-1 shows a compliance comparison chart for turbidity sampling less than the MAC of 1 NTU and the percentage of required facilities testing and submitting samples for the 2000/2001 fiscal year versus the 1999/2000 fiscal year, based on testing by system owners$_{(15)}$.

Seventy-nine percent of the turbidity analysis results complied with the drinking water quality objective of 1 NTU, which represents a 91% facility compliance rate during the 2000/2001 fiscal year. In comparison, eighty-two percent of turbidity results complied with the turbidity objective of 1 NTU, with a 66 % facility compliance rate during the 1999/2000 fiscal period.

The data for the Figure 2-1 consists of data reported by the system owners on their bacteriological sample submission forms. Ground water, surface water and blended systems with turbidity monitoring requirements are included.

The range of turbidity results tested by all agencies[15] in 2000/2001 (municipal, private and government owners) were:

Turbidity Range (NTUs)	Samples	% Samples	Systems
0 - 1	4,068	79.1 %	145
1 - 2	666	13.0 %	70
2 - 3	237	4.6 %	45
3 - 4	88	1.7 %	23
4 - 5	28	0.5 %	13
> 5	54	1.1 %	16
	5141	100%	155

Of the 170 licenced facilities with turbidity monitoring requirements 145 facilities reported 4,068 of the 5,141 turbidity results to be less than the MAC, for a compliance rate of 79.1 %; more than 1.0 % of results exceeded 5 NTUs.

The range of turbidity results tested by all agencies[15] in 1999/2000 were:

Turbidity Range (NTUs)	Samples	% Samples	Systems
0 - 1	3,218	82.3 %	313
1 - 2	434	11.1 %	83
2 - 3	130	3.3 %	41
3 - 4	51	1.3 %	19
4 - 5	21	0.5 %	14
> 5	57	1.5 %	35
	3,911	100%	124

The licenced facilities found 3,218 of the 3,911 turbidity results to be less than the MAC, for a compliance rate of 82.3%; 1.5 % of results exceeded 5 NTUs.

2.3 Chlorine Residuals

Municipalities must provide multiple barriers to waterborne disease in their waterworks systems to ensure public health and safety. These barriers include protection of their raw water supplies (watersheds, reservoirs and well fields); employing treatment processes such as coagulation, sedimentation, filtration and disinfection; cleaning of storage and distribution systems; and prevention of cross connections in their distribution systems. **Disinfection by chlorination is one of the key barriers to the spread of waterborne disease.**

Sections 23(3) and (4) of the Waterworks Regulations[1] require municipalities to continuously

disinfect their drinking water. These regulations also stipulate that the owner or operator of a waterworks maintain:

(a) a free chlorine residual of not less than 0.1 milligrams per litre in the water entering a distribution system; and

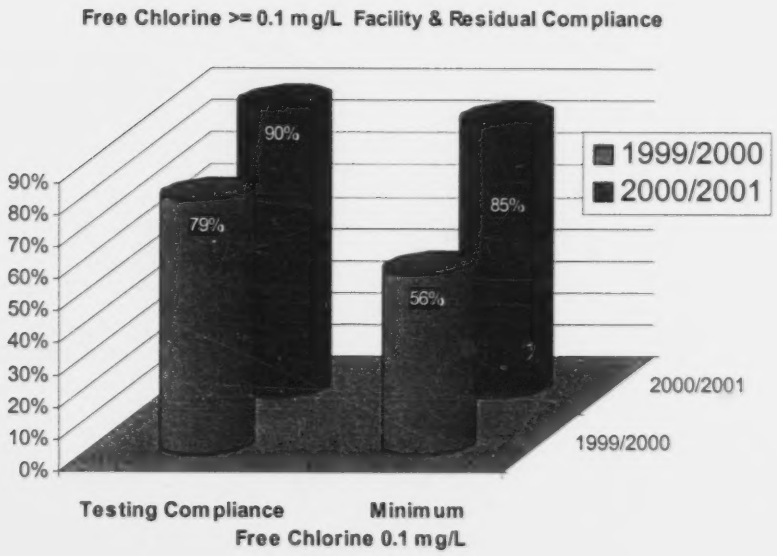
(b) a total chlorine residual of not less than 0.5 milligrams per litre or a free chlorine residual of not less than 0.1 milligrams per litre in the water throughout the distribution system.

Section 25(6)(a) of the Waterworks Regulations$_{(1)}$ requires the owner or operator of a waterworks to take daily chlorine residual tests to confirm if the required residuals are being achieved. SERM does not require the owners and operators of licensed works to routinely submit these test results, although they are checked by SERM during site inspections. Testing of free and total chlorine residuals at the treatment plants and within the distribution systems is also conducted by SERM during inspections. SERM encourages municipalities to record chlorine residuals on bacteriological sample submission forms.

The guideline for minimum monthly chlorine monitoring$_{(5)}$ is:

- for free chlorine residual -- once per day from treated water at the water treatment plant; and
- for free and total chlorine residuals -- the same frequency and locations used for bacteriological sampling.

Figure 2.2 Free Chlorine Compliance



A total of 493 municipalities reported 17,398 analyses of free chlorine in 2000/2001. The statistical results were:

Mean:	0.496 mg/L
Median:	0.30 mg/L
High:	16 mg/L
Low:	0.01 mg/L
Sum:	8,636.02 mg/L
Count:	17,397 samples

All 548 municipalities should have reported free chlorine residuals (compliance rate of 90.0 %). A total of 20,787 residuals were required, therefore the submission rate for testing was 83.7%. More than 85 % of the sample results met the minimum requirement for free chlorine.

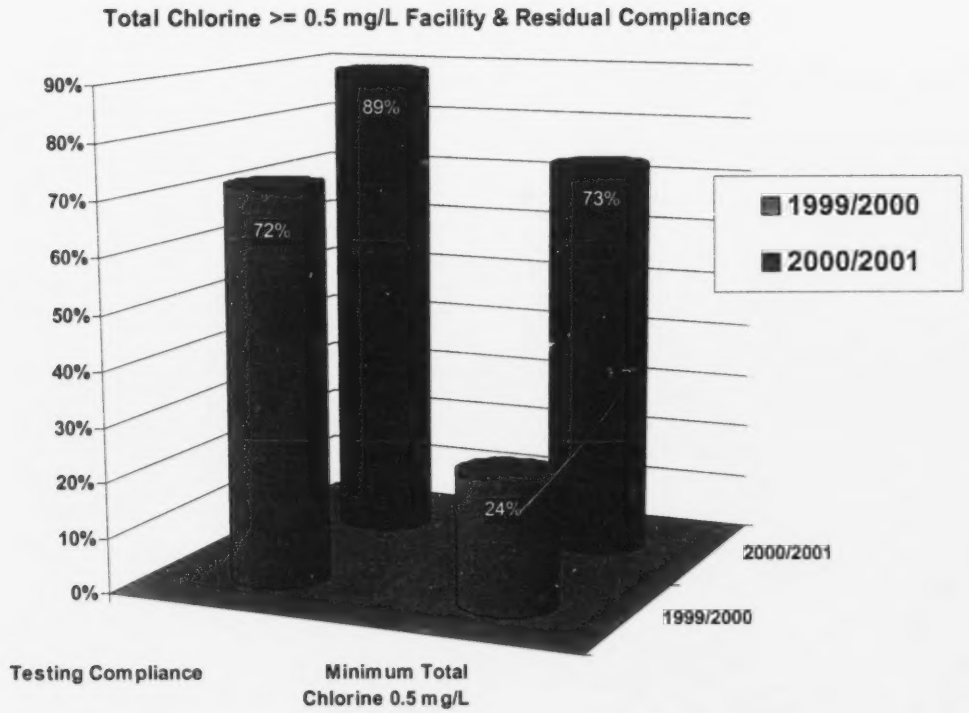
In 1999/2000 a total of 436 municipalities reported 13,477 analyses of free chlorine. The statistical results were:

Mean:	0.405 mg/L		
Median:	0.30 mg/L	High:	5.8 mg/L
Low:	0.0 mg/L		
Sum:	5,452.84 mg/L		
Count:	13,477 samples		

All 552 municipalities should have reported free chlorine residuals (compliance rate of 78.9%). A total of 19,942 residuals were required, therefore the submission rate for testing was 56.3%. Over 56% of the sample results met the minimum requirement for free chlorine.

About 2,524 samples from 254 municipalities analysed for free chlorine in the 2000/2001 fiscal year contained concentrations less than the regulatory minimum of 0.1 mg/L. Therefore 52 % of the 493 municipalities that reported free chlorine tests failed to meet the minimum chlorine residual regulation at some time during the fiscal year. A large percentage of the many municipalities that failed to report chlorine tests are likely to have had residuals less than the regulatory minimum. This finding is higher than those reported in 1999/2000, however, 57 more facilities tested and reported free chlorine in 2000/2001 .

Figure 2.3 Total Chlorine Compliance



A total of 490 municipalities reported 17,082 analyses of total chlorine during the 2000/2001 fiscal year. The statistical results were:

Mean:	0.932 mg/L
Median:	0.75 mg/L
High:	6.9 mg/L
Low:	0.01 mg/L
Sum:	15,916.5 mg/L
Count:	17,082 samples

All 548 municipalities should have reported total chlorine residuals (compliance rate of 89 %). A total of 20,787 residuals were required, therefore the submission rate for testing was 82.2%. More than 73 % of the reported results met the minimum requirement for total chlorine.

A total of 393 municipalities reported 13,331 analyses of total chlorine during the 1999/2000 fiscal year. The statistical results were:

Mean: 0.812 mg/L
Median: 0.64 mg/L
High: 24 mg/L
Low: 0.01 mg/L
Sum: 10,822.82 mg/L
Count: 13,331 samples

All 548 municipalities should have reported total chlorine residuals (compliance rate of 72 %). A total of 20,787 residuals were required, therefore the submission rate for testing was 64.1%. Less than 24 % of the reported results met the minimum requirement for total chlorine.

A total of 1,664 of the 17,082 samples (9.7%) analyzed by 242 facilities in 2000/2001 contained total chlorine concentrations less than the required minimum of 0.50 mg/L and a free chlorine concentration of less than the required minimum of 0.1 mg/L at some point during the fiscal year . The figure of 242 facilities in non-compliance with total chlorine or free chlorine residual regulations accounts for 49.4% of the facilities that actually reported total chlorine tests during the fiscal year. Non-compliance is expected to be substantially higher in communities that did not report chlorine residuals.

There are 13 Saskatchewan municipalities that did not continuously disinfect their drinking water .

A non-chlorinating system, for the purposes of the following listing (as of March 23, 2001), is a system where chlorine is not added regularly for disinfection purposes. Non-chlorinators would include systems where chlorine is used only for disinfection of repairs, clearwells, etc., but where chlorine is not used regularly. Non-chlorinators would **not** include systems where chlorine is added manually at regular intervals (eg. at least once per day - such systems would be considered as chlorinating).

Beaubier
Candiac
Gladmar
Herschel
Hubbard
Lake Alma
Pathlow
Penzance
Readlyn
St. Victor
Verwood
Wood Mountain
Zelma

The above list represents a net improvement of 2 additional municipalities which now continuously chlorinate their water supply since the 1999/2000 report.

2.4 Microbiological Sample Submission Performance

Based on SERM's monitoring guidelines for bacteriological sampling(5), and the Ministers Orders issued to the owner of each municipal waterworks, the total submission requirement for bacteriological samples is estimated at 20,345 samples per year(12). The City of Saskatoon is not included in this assessment, as they test their own bacteriological samples, and provide separate reports to SERM.

A total of 18,339regular bacteriological samples were received from licensed waterworks, giving an overall compliance rate of 90.1 %. A total of 299 of these were null samples - they could not be counted because:

193	were too old
23	were involved in lab accidents
32	contained interferences
12	were broken in transit.
39	lab results questionable

Total: 299	

Therefore, the net compliance rate for submission of the 18,040 valid samples was 88.7%.

There were 6 licensed waterworks that submitted no drinking water samples for bacteriological testing. These systems were: Beatty, Laporte, Laurier, Okla,, Riverside, and Shamrock(15).

2.5 **Excursions** (exceeds regulated value)

In addition to regular municipal samples, 1019 repeat bacteriological samples were received from 333 systems, and 934 special bacteriological samples were submitted by 119 systems.

A repeat sample is required to confirm the initial result when a regular sample is positive (contaminated). When a repeat sample is positive, a system owner is required to submit three special samples to assist in identifying the nature and extent of contamination.

Regular Sample Excursions

A total of 1151 of the 18,040 valid regular samples were positive (6.4%). The distribution of positive samples between total coliform, background and fecal coliform positives is shown in **Figure 2-5.** Distribution of facility per cent positives is shown in **Figure 2-4**

Over 381 regulated waterworks (70%) had drinking water which failed to meet provincial bacteriological objectives at some time during the year.

Nineteen regulated waterworks had more than 50% of their regular samples test positive; they were: Benson, Brooksby, Coteau Beach, Crystal Lake, Demaine, Fairlight, Hagen,

Handel, Hubbard, Island View Drive, Keeler, Kincaid, Lumsden Beach,Mistatim, Primate, Scout Lake, Senlac, Valparaiso and Verwood.

Another 41 Regulated Waterworks had between 25% and 50% of their samples test positive; they were: Amsterdam, Beaubier, Big Beaver, Cadillac, Candiac, Chamberlain, Colgate, Corning, Cumberland House, Davin, Dore Lake, Eldersley, Erwood, Flaxcombe, Fosston, Grandview Beach, Gronlid, Hendon, Herbert, Herschel, Laird, Landis, Leslie, Macnutt, Marengo, Mendham, Michel Village, Osage, Parkbeg, Parry, Ridgedale, Snowden, Sovereign, Trossachs, Tuffnell, Vawn, Viceroy, Webb, Weirdale, Wood Mountain and Zealandia.

A total of 161 communities had greater than 10% of their regular bacteriological samples test positive during the year.

Figure 2-4 - Facility Distribution of Bacteriological Positives Comparison

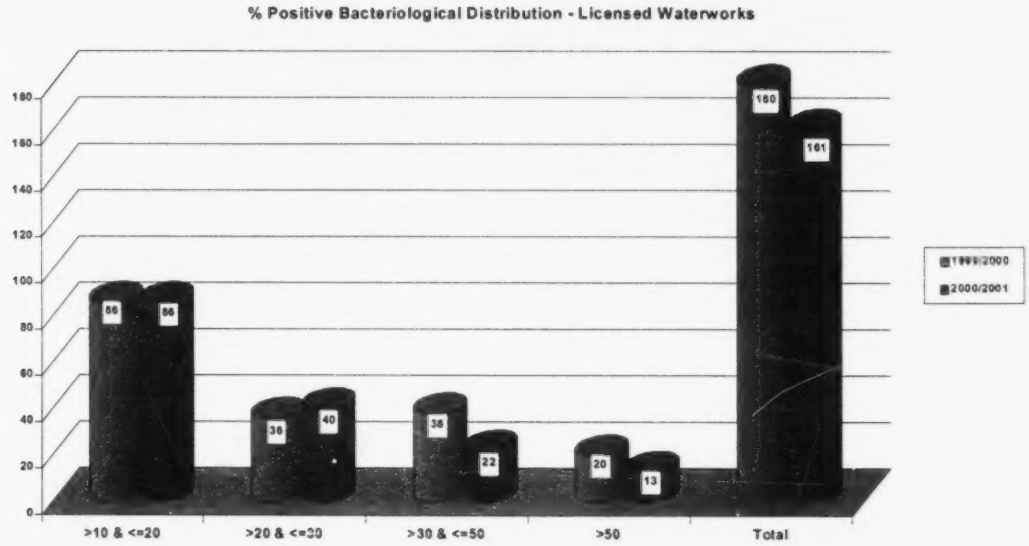
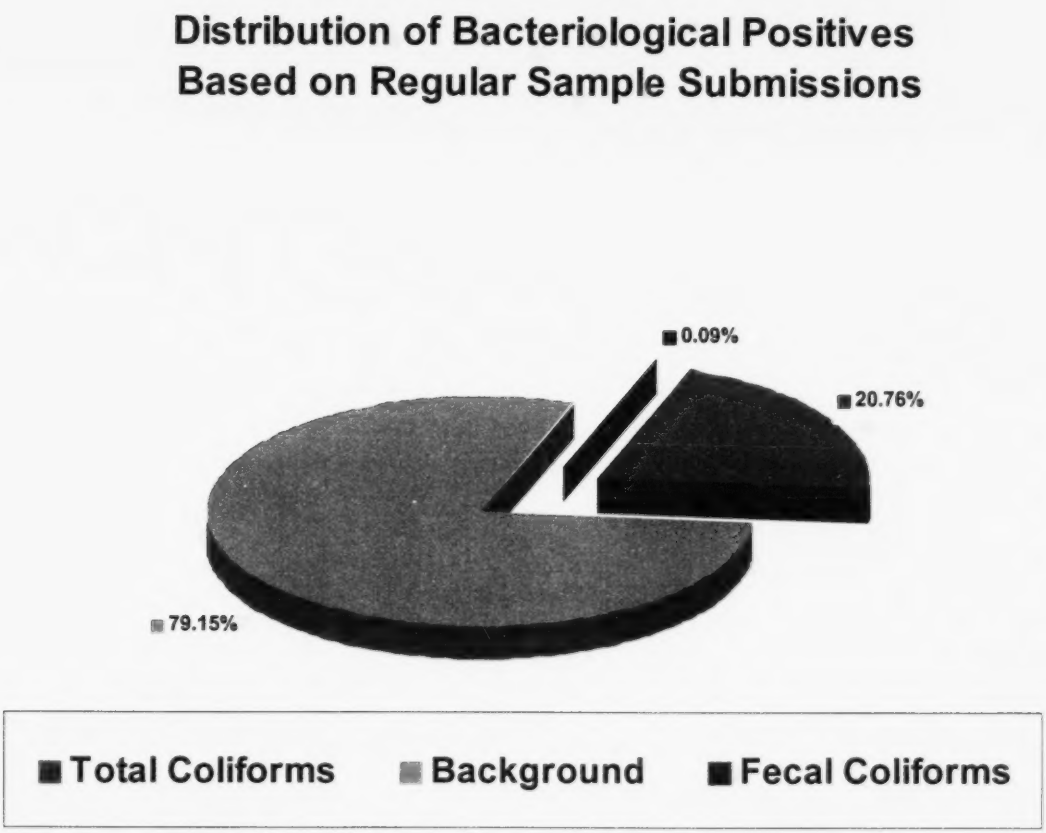


Figure 2-5 - Distribution of Regular Bacteriological Sample Positives



Repeat Bacteriological Samples

The 1151 positive regular samples should have resulted in the submission of 1151 repeat samples. **Only 1019 repeat samples were received (88.5%).** Of these 1019 repeat samples, 231 were positive (22.7%).

Special Bacteriological Samples

The 231 positive repeat samples should have resulted in the submission of 693 specials. **934 specials were received (135%).**

Of the 934 specials received, 244 were positive (26.1%).

Compliance with submission of repeat samples was 88.5%. Special sample submission compliance significantly increased from the 1999/2000 results to 135%.

The above represents a significant improvement in repeat and special sample compliance when compared to the 1999/2000 data. In 1999/2000 only 22% of all required special samples were submitted.

2.6 Minimum Surface Water Treatment

To ensure that Saskatchewan residents receive safe and palatable drinking water, the province recommends that certain minimum treatment processes be employed in each surface water treatment system. These processes include: coagulation-flocculation, sedimentation, filtration, disinfection and taste/odour control. Also, systems with chemically-assisted filtration and disinfection, or cartridge filtration and disinfection are considered to be employing minimum treatment.

Based on a March 23, 2001 compilation of data, 16 systems did not meet the province's minimum guidelines for surface water treatment; they included: Antler, Benson, Broderick, Brooksby, Corning, Crooked River, Eldersley, Erwood, Fairy Glen, Gronlid, Liberty, Mistatim, Parkbeg, Prairie River, Rama, and Ridgedale.

2.7 Minimum Ground Water Treatment

The minimum recommended treatment for ground water in Saskatchewan is disinfection. Based on a March 23, 2001 compilation of data, approximately 13 systems did not meet the province's minimum guidelines for ground water treatment; they included: Beaubier, Candiac, Gladmar, Herschel, Hubbard, Lake Alma, Pathlow, Penzance, Readlyn, St.Victor, Verwood, Wood Mountain, and Zelma.

3.0 Trihalomethanes (THMs)

3.1 General Introduction

Rationale

Trihalomethanes (THMs) are generated during the water treatment process as a by-product of free chlorine reactions. Significant levels of THMs may occur when the raw water is obtained from a surface water supply. THM's exceeding 100 ug/L pose a carcinogenic health risk to consumers who use the drinking water over prolonged periods. Municipalities monitor THMs to assess health risks and to evaluate the effectiveness of their treatment processes.

For comparison to the THM objective, the winter, spring, summer and fall readings are averaged to calculate an average annual value. THM values illustrate seasonal variability, therefore it is necessary to sample on a seasonal basis.

Drinking Water Quality Objectives

The maximum acceptable concentration of total trihalomethanes (the sum of chloroform, bromodichloromethane, chlorodibromomethane, bromoform) in drinking water is 100 ug/L based on an annual average of seasonal samples. The guideline requirements for THM monitoring[5] are shown in Table 3-1.

Table 3-1 - THM Monitoring Guidelines

Population	Groundwater Source	Surface Water and Blended Source
0 - 100	Nil	1 per 3 months during each Spring, Summer, Fall and Winter
101 - 500	Nil	1 per 3 months during each Spring, Summer, Fall and Winter
501 - 5000	Nil	1 per 3 months during each Spring, Summer, Fall and Winter
5001 - 100,000	Nil	2 per 3 months during each Spring, Summer, Fall and Winter
Greater than 100,000	Nil	2 per 3 months during each Spring, Summer, Fall and Winter

3.2 Sample Submission Performance

A total of 171 surface water treatment and delivery facilities are required to participate in the trihalomethane monitoring program, which should result in 728 samples being submitted each year. The actual number of municipalities that submitted samples was 136 (79%). It should be noted that 118 (84%) of the 136 municipalities that submitted samples submitted the required seasonal samples. A total of 709 samples (97% overall compliance) were submitted by the facilities.

The statistical results are tabulated in Table 3-2.

Table 3-2 - THM Sample Result Distribution

Average Annual THM (ug/L)	Number of Samples	Number of Submitters	THM Range (ug/L)	Number of Samples	Number of Submitters
all	709	136	0-50	149	71
>50	599	113	51-100	179	73
>100	389	72	101-350	273	90
>350	28	5	351-500	26	18
>500	5	1	>500	5	3

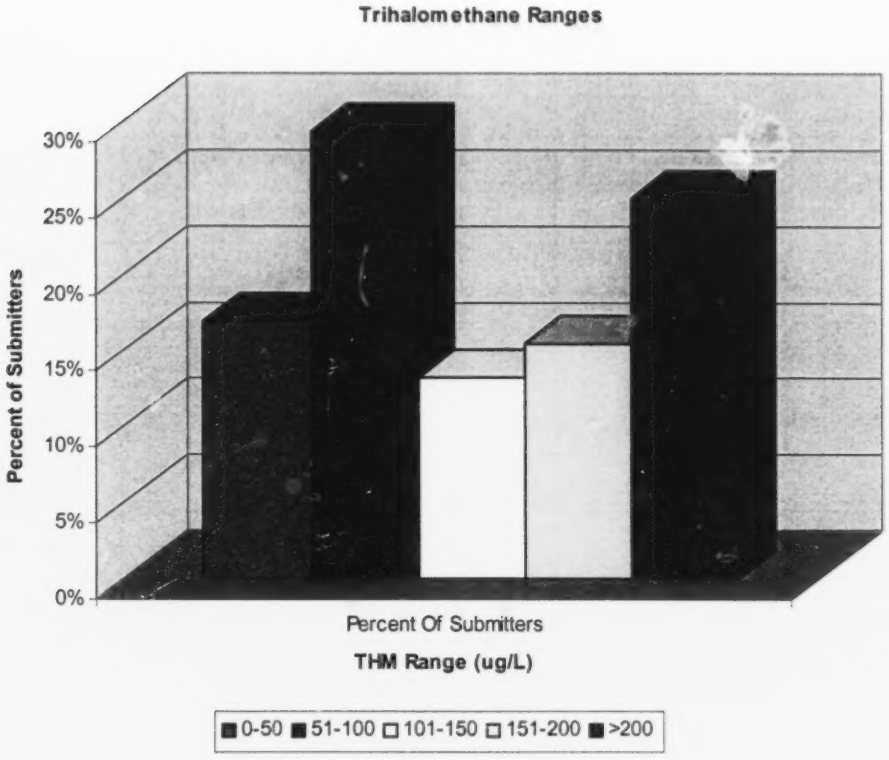
3.3 Excursions

With respect to the annual average of seasonal results, the following is a summary of the number of municipalities that submitted and exceeded the maximum acceptable concentration for trihalomethanes$_{(15)}$.

- 9 municipalities averaged <100 ug/L and submitted less than 4 samples.
- 54 municipalities averaged <100 ug/L and submitted at least 4 samples.
- 9 municipalities averaged >100 ug/L and submitted less than 4 samples.
- 64 municipalities averaged >100 ug/L and submitted at least 4 samples.

The actual THM distribution, based on annual averages of seasonal samples, is shown in Figure 3-1.

Figure 3-1 - Trihalomethane Ranges



Ninety-three (93) regulated waterworks (66%) submitted 305 samples for analysis that were over the maximum acceptable concentration for trihalomethanes$_{(15)}$.

During the 1999/2000 fiscal year sixty-five (65) regulated waterworks (46%) submitted 137 samples that were over the maximum acceptable concentration for trihalomethanes$_{(15)}$.

The increase in the number of trihalomethane samples with results greater than the maximum acceptable concentration during the 2000/2001 fiscal year can be attributed to the significant increase in chlorine residuals (post Walkerton reaction) noted for the same period.

4.0 Health and Toxicity Related Chemicals

4.1 General Introduction

Rationale

Health and toxicity related chemicals are a grouping of parameters of health significance to drinking water consumers. These contaminants may be naturally occurring, or they may be introduced into drinking water by human activities.

Iron, manganese, copper, and zinc are included in the general chemical classification. Health and toxicity related samples are collected from the treated water at the water treatment plant.

Drinking Water Quality Objectives

This category comprises inorganic and organic chemical substances that pose a health hazard to individuals if present above certain concentrations in drinking water. For most parameters, the specified Maximum Acceptable Concentrations (MACs) have been derived by assessing the possibility of adverse effects after prolonged exposure.

Table 4-1 - Canadian Drinking Water Quality Guidelines[14]

MAC - Maximum Acceptable Concentration
IMAC - Interim Maximum Acceptable Concentration
AO - Aesthetic Objective

Parameter	MAC	IMAC	AO
	mg/L	mg/L	mg/L
Arsenic	0.025		
Barium		1.0	
Benzene	0.005		
Benzo(a)pyrene	0.00001		
Boron	5.0		
Cadmium	0.005		
Carbon tetrachloride	0.005		
Chromium	0.05		
Cyanide	0.2		
Dichlorobenzene, 1, 2	0.2		0.003
Dichlorobenzene, 1, 4	0.005		0.001
Dichloroethane, 1, 2		0.005	
Dichloromethane	0.05		
Dichlorophenol, 2, 4	0.9		0.0003
Ethylbenzene			0.0024
Fluoride (1)	1.5		
Lead	0.01		
Mercury	0.001		
Monochlorobenzene	0.08		0.03
Nitrates as No_3	45.0		
Nitrilotriacetic acid (NTA)	0.4		
Selenium	0.01		
Tetrachlorophenol, 2,3,4,6	0.1		0.001
Toluene			0.024
Trichloroethylene	0.05		
Trichlorophenol, 2,4,6	0.005	0.002	
Trihalomethanes (THM)(2)	0.1		
Uranium	0.1		
Xylenes			0.03

(1 - see Section 6 of this report)
(2 - see Section 3 of this report)

Monitoring guidelines for health/toxicity chemicals[15] are shown in Table 4-2.

Table 4-2 - Health/Toxicity Chemical Monitoring Guidelines

Population	Groundwater Source	Surface Water and Blended Source
0 - 100	1 per 2 years	1 per 2 years
101 - 500	1 per 2 years	1 per 2 years
501 - 5000	1 per 2 years	1 per 2 years
5001 - 25,000	Annually	Annually
>25,000	1 per 6 months	1 per 6 months

4.2 Sample Submission Performance

Sample submission requirements for health and toxicity related chemicals were based over a two year (April 1,1999 to March 31, 2001) period to reflect the monitoring guidelines for some of the facilities of one sample per two years.

A total number of 545 facilities were required to sample$_{(12)}$, of which 174 facilities complied (30% compliance)$_{(15)}$.

A total of 640 samples were required, and 191 samples were submitted (30% compliance).

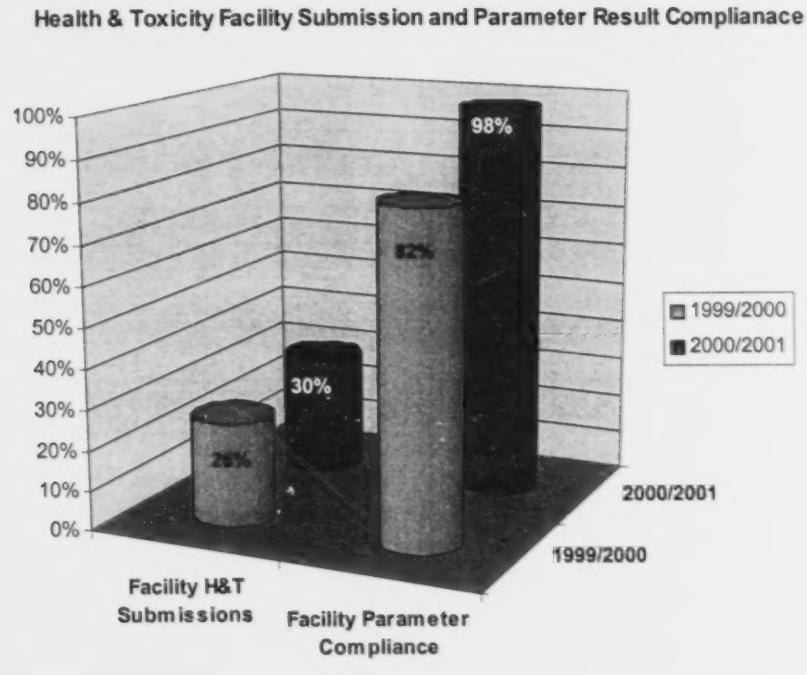
4.3 Excursions

The total number of facilities that had at least one health and toxicity related chemical excursion was 4*. There were a total of 5 excursions. The following is a list of the parameters and number of excursions at all the facilities:

Arsenic - 0
Boron - 0
Cadmium - 0
Chromium - 0
Copper - 0
Lead - 1
Nitrate - 3
Selenium - 1

*** The number of facilities identified in this section with health and toxicity related chemical excursions differs from the number identified in a May, 2001 SERM document. The May, 2001 document identified facilities with a history of health and toxicity related chemical problems with their drinking water. Some of these facilities did not submit samples during the review period of this report.**

Figure 4-1 Health and Toxicity Compliance



30% of SERM licensed waterworks submitted samples; 95% of these waterworks met the drinking water quality objectives for H&T related chemicals during the 2000/2001 fiscal year.

In the 1999/200 fiscal period, 26% of municipalities submitted samples; 82% of these municipalities med the drinking water quality objectives for H&T related chemicals.

5.0 Pesticides

5.1 General Introduction

Rationale

The potential for pesticide detection may vary seasonally. Local use also varies, and there have been relatively few problems with pesticide contamination of drinking water in Saskatchewan. For these reasons, pesticide monitoring is not required in the province, except by communities with populations greater than 5,000.

Drinking Water Quality Objectives

The provincial objective is no detection of pesticides in drinking water[3]. The MACs cited in Table 5-1 are those developed by Health Canada[14] for long-term health exposure.

Table 5-1 - Pesticide Guidelines[14]

Parameter	MAC mg/L	IMAC mg/L	AO mg/L
Atrazine		0.06	
Bromoxynil		0.005	
Dicamba	0.12		
Dichlorophenoxyaceticacid - 2,4 (2, 4-D)	0.1		
Diclofop-methyl	0.009		
Lindane	0.004		
Methyl-4-chlorophenoxyacetic acid,-2 (MCPA)			
Pentachlorophenol	0.06		0.03
Picloram		0.19	
Propanil			
Triallate	0.23		
Trifluralin		0.045	

It is recognized that this list of pesticides does not include all those available. The list constitutes only a small fraction of the number of such substances used in Canada. Monitoring guidelines for pesticides[5] are outlined in Table 5-2.

Table 5-2 - Pesticide Monitoring Guidelines

Population	Groundwater Source	Surface Water and Blended Source
0 - 100	Nil	Nil
101 - 500	Nil	Nil
501 - 5000	Nil	Nil
5001 - 100,000	1 every 3 years	1 every 2 years
>100,000	Annually	Annually

5.2 Sample Submission Performance

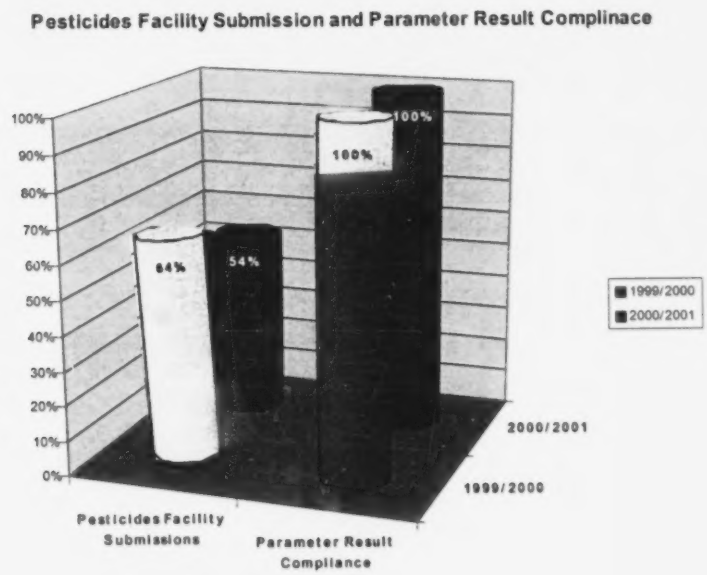
A total number of 11 municipalities are required to sample for pesticides[12]. The monitoring guideline varies between annually, one sample every two years, and one sample every three years.

Six out of the 11 municipalities submitted a sample for pesticide analysis[15].

5.3 Excursions

There were no excursions or detections for pesticides during the 2000-2001 fiscal year[15].

Figure 5-1 Pesticide Compliance



6.0 Fluoride

6.1 General Introduction

Saskatchewan municipalities may decide to artificially add fluoride to their drinking water for the prevention of tooth decay. This decision is often put to the public in the form of a referendum or plebiscite.

Many raw water supplies contain some fluoride. Therefore municipalities need to add differing amounts of fluoride to their drinking water to achieve the optimum range of 0.8 mg/L to 1.2 mg/L. The objective target[3] is 1.0 mg/L. Saskatchewan's MAC for fluoride is 1.5 mg/L.

There are three fluoride chemicals used to add fluoride to drinking water. They are, in order of their estimated volume of usage in the province: hydrofluosilicic acid, sodium silicofluoride and sodium fluoride. If a system owner decides to fluoridate, technical help and advice are available from the Regional Offices to assist in process implementation and operation.

Systems that add fluoride are required to monitor their drinking water for fluoride on a regular basis, as shown in Table 6-1.

Table 6-1 - Fluoridation Monitoring Guidelines[5]

POPULATION	GROUNDWATER SOURCE	SURFACE WATER AND BLENDED SOURCE
0 - 100	1 per 4 weeks	1 per 4 weeks
101 - 500	1 per 4 weeks	1 per 4 weeks
501 - 5,000	1 per week	1 per week
5,001 - 100,000	1 per week	1 per week
Greater than 100,000	1 per week	1 per week

There are presently 86 licensed works that artificially fluoridate their drinking water or have naturally occurring fluoride (*) in Saskatchewan. They are listed as follows:

Allan
Annaheim
Assiniboia
Balgonie
Beatty
Big River
Bradwell
Bruno
Bushell Park
Canora
Carnduff
Central Butte (*)
Clavet
Coleville (*)
Cutknife
Dalmeny
Domremy
Elstow
Estevan (*)
Eston
Ferland (*)
Foam Lake
Frontier (*)
Goodsoil
Gull Lake
Hawarden (*)
Hoey
Humboldt
Indian Head
Kamsack
Kerrobert (*)
Kindersley
Kinistino
La Loche (*)
La Ronge
Lafleche
Lake Lenore
Langenburg
Langham
Lashburn
Loreburn
Luseland
Macoun (*)
Major (*)

Markinch (*)
Marsden
Martensville
Meadow Lake
Melfort
Melville
Moose Jaw
Moosomin
Mortlach
Muenster
Naicam
Osler
Outlook
Paynton
Preeceville
Primate (*)
Prince Albert
Rosetown
Rosthern
Rouleau
Rush Lake (*)
Saskatoon
Smiley (*)
South Corman Park
Sovereign (*)
St. Isisdore de Bellevue
Star City
Strongfield (*)
Swift Current
Tisdale
Turtleford
Viceroy (*)
Wadena
Wakaw
Warmen
Watson
Weyburn
Whitewood
Willow Bunch (*)
Woodrow (*)
Wynyard

This equates to a total Saskatchewan population[16] of 384,358 (37.7% of the total of 1,019,500 based on 1996 census) receiving fluoridated drinking water.

6.2 Fluoride Excursions

Three communities have fluoride naturally present in their water supplies at concentrations exceeding the MAC of 1.5 mg/L in 2000/2001. They are:

Ferland
Frontier
Rush Lake

Results from all systems that artificially fluoridate or that have high naturally occurring fluoride are monitored regularly by SERM.

A total of 2,315 samples were submitted by 236 systems for fluoride analysis. **Only 7 municipalities had one or more result which exceeded the MAC of 1.5 mg/L.** Of these 7 municipalities, 3 are known to have high natural fluoride, and 7 artificially fluoridate their water. Communities with high natural fluoride have been notified, and Saskatchewan Health has been advised.

Fluoride concentration statistics from the municipalities were as follows:

Mean:	0.776 mg/L
Median:	0.78 mg/L
High:	3.26 mg/L
Low:	0.04 mg/L
Sum:	1,797.28 mg/L
Count:	2,315 samples

Note: These data include routine submission data from fluoridating systems, as well as routine monitoring done by non-fluoridating systems with the General Chemical samples they submit in accordance with their Ministers Orders.

7.0 Total Dissolved Solids

7.1 General Introduction

The guideline for total dissolved solids (TDS) relates to taste and palatability rather than to detrimental health effects on humans. TDS concentrations of 500 mg/L or less have been designated as a Canadian objective[(14)] level for drinking water, provided that none of the individual constituents exceed their specific guidelines. If the TDS concentration exceeds 2000 mg/L laxative effects have been observed in drinking water consumers. Saskatchewan has designated the TDS objective of 1,500 mg/L due to the relatively elevated mineral concentrations of provincial water supplies[(3)].

Rationale

The composition and concentration of general chemicals identify a water's chemical character. This will vary among supply sources. A groundwater supply generally will have less variability than surface water, which tends to vary at least on a seasonal basis. Monitoring is done to track trends, to make treatment process decisions, and to provide information for environmental impact evaluation. Iron and manganese are two significant aesthetic issues for Saskatchewan municipalities, many of whom treat their drinking water to remove these metals.

Drinking Water Quality Objective

Saskatchewan's aesthetic objective for total dissolved solids in drinking water is 1,500 mg/L[(3)]. Monitoring guidelines[(5)] for TDS are shown in Table 7-1.

Table 7-1 - TDS Monitoring Guidelines

Population	Groundwater Source	Surface Water and Blended Source
0 - 100	1 per 2 years	1 per 3 months every 2 years
101 - 500	1 per 2 years	1 per 3 months every 2 years
501 - 5000	1 per 2 years	1 per 3 months every 2 years
5001 - 100,000	1 per 6 months	1 per 3 months
>100,000	1 per 6 months	1 per 3 months

Table 7-2 outlines Saskatchewan's General Chemical parameters.

Table 7-2 - Objectives for General Chemical Parameters[(3)]

Parameter	AO (mg/L)
Alkalinity (as $CaCO_3$)	500
Chloride	250
Copper	1.0
Hardness (as $CaCO_3$)	800
Iron	0.3
Magnesium	200
Manganese	0.05
Sodium (1)	300
Sulphate (2)	500
Sulphide (as H_2S)	0.05
Total Dissolved Solids	1500
Zinc	5

This category comprises certain chemical substances that could, if present in excessive amounts, interfere with the intended domestic uses of the finished water. These chemicals may be aesthetically objectionable, interfere with water treatment processes and distribution, or stain fixtures and plumbing. Aesthetic objectives have therefore been established for these substances.

1. It is recommended that sodium be included in routine monitoring programs since levels may be of interest to authorities who wish to prescribe sodium-restricted diets for their patients.

2. There may be a laxative effect in some individuals when sulphate levels exceed 500 mg/L.

7.2 Sample Submission Performance

Sample submission for total dissolved solids was based on general chemical submission over a two year period to reflect the monitoring guidelines for some facilities of one or four samples per two years.

A total number of 597 facilities were required to sample, of which 209 facilities complied (35% compliance)$_{(15)}$.

A total of 1141 samples were required and 335 samples were submitted (29% compliance).

The statistical results$_{(15)}$ are tabulated in Table 7-3, and shown graphically in Figure 7-1.
A comparison to the 2000/2001 report on TDS Compliance is shown graphically in Figure 7-2.

Table 7-3 - TDS Ranges (1999-2001)

TDS levels (mg/L)	0-500	501-1000	1001-1500	1501-2000	2001-2500	2501-3000	>3000
FACILITIES	45	54	59	37	21	6	2
SAMPLES	94	88	73	45	23	8	4

Figure 7-1 - TDS Distribution

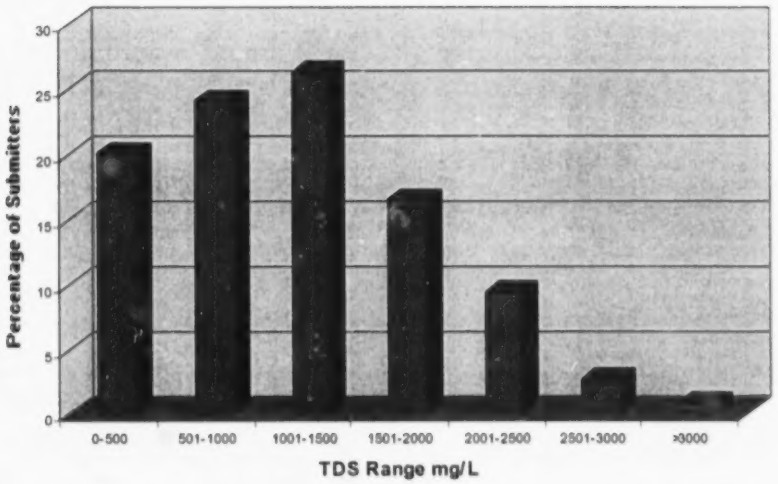
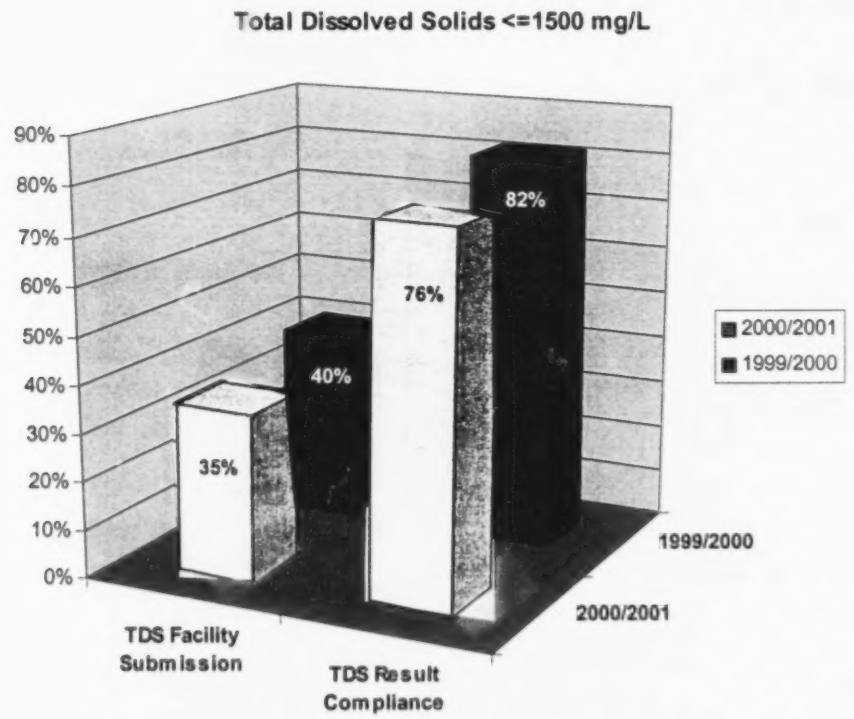


Figure 7-2 - TDS Compliance Comparison



7.3 Excursions

The total number of facilities that exceeded the aesthetic objective of 1,500 mg/L for total dissolved solids was 64 or 31% of the facilities submitting. There were 80 samples or 24% of the samples submitted that exceeded the aesthetic objective.

8.0 System Operators

8.1 General Introduction

Rationale for Operator Certification

Water/wastewater system operators, who play a critical role in producing safe drinking water and preventing environmental pollution, are finding their jobs becoming more responsible, more complex and subject to a great deal of technological change. Increasing public awareness and knowledge of drinking water safety, and wastewater pollution issues have placed much higher expectations for change on municipalities and their operations. Ensuring that the training and qualifications of these operators will meet the challenge of providing safe drinking water and environmental protection is of prime concern to the public, the system managers and to regulators[17][18].

The PUBLIC needs trained and certified operators to provide safe drinking water and to protect itself and the environment from pollution.

SYSTEM MANAGERS need certified operators, because certification is an indication of an operator's knowledge, skills and competency obtained through training to operate complex treatment and testing equipment. Managers need to know that operators can safeguard a community's investment in the water utility and in its investment in the on-going budget.

REGULATORS who establish and monitor water quality criteria which facilities must meet need trained and certified operators to ensure that these parameters are being met in a consistent manner.

Studies have consistently found that the mandatory certification of operators along with a comprehensive training program is necessary to ensure that the required education, skill training and examination of knowledge occurs, in order to achieve the operational standards needed within the industry.

Legislation and Mandate for Mandatory Certification Program

The ***Environmental Management and Protection Act***[2] states in article 38 (f) that "The Lieutenant Governor in Council may make regulations respecting the training and qualification of operators of industrial effluent works, waterworks and sewage works." Articles 38 (g) -(i) state that the Lieutenant Governor in Council may make regulations pertaining to the establishment of a certification board, and they explain the powers and duties of the board and the terms and conditions whereby board members are appointed.

On July 14, 2000 ***The Water Pollution Control and Waterworks Amendment Regulations, 2000*** **(WPCWAR)** were enacted pursuant to section 38(1) of ***The Environmental Management and Protection Act***. These regulations established an Operator Certification Board and empowered the Board to administer the Operator Certification Program.

Within five (5) years after the coming to force of the **WPCWAR**, all municipal water and wastewater treatment facilities in the Province of Saskatchewan are required to have a certified operator to supervise the operation and maintenance of these works. The same requirement also applies to non-municipal works, which are privately owned water and wastewater works with an average flow of potable water or wastewater, in three consecutive months having the greatest flow in a year, exceeding 18 cubic metres per 24-hour period.

8.2 Compliance With Voluntary and Mandatory Certification Program

Number of Operators Participating

At the end of fiscal year 2000/2001 there were 1,475 municipal operators on the training and certification database[12]. Of these, 478 operators were certified in the **voluntary** and **mandatory** certification program; this is a participation rate of 32 per cent, which surpassed the 1999/2000 participation rate by 3%.

Depending on the size of a community, and particular duties, an operator could be involved in any or all of the following work categories, namely: water treatment, water distribution, and, not shown in Table 8-1, wastewater treatment and wastewater collection[7]. An operator could be certified in one, several or all of these categories, at different levels or classes, depending on the area(s) in which the operator is working. Additionally, the operator could be certified at any one of four classes or levels within each of the categories, depending on formal education, work experience and system size and complexity, ranging from class 1 (small system) to class 4 (large and complex system).

Since this report is only dealing with drinking water, i.e. water treatment and water distribution, Table 8-1 only shows the number of voluntary and mandatory certified operators in the four classes or levels of certification in water treatment and water distribution.

Table 8-1 - Distribution of Voluntary and Mandatory Certified Operators[12]

	Water Treatment		Water Distribution	
	Vol.	**Man.**	**Vol.**	**Man.**
Class 1	174	32	220	34
Class 2	112	19	58	8
Class 3	19	12	3	1
Class 4	0	4	-	-
Total	305	67	281	43

Historically, the participation of operators in the certification program has been most prevalent in the areas of water treatment and (not shown) wastewater treatment, and less so in the areas of water distribution and (not shown) wastewater collection. The largest number of operators that are certified are in the water treatment class 1 and class 2 categories, because operators at these levels are employed in small communities and usually turn to SERM for technical assistance and turn to SERM, SWWA and SIAST for operator training. While participating in this manner, operators and the communities that employ them are informed about the certification program and of the benefits of training and certification. Operators from larger facilities (class 3 or class 4) have historically not participated in the operator training and operator certification program to the same extent, since they make less use of the technical assistance and training provided by SERM. This is mostly because they have in-house technical and engineering staff that are able to provide this service. On the other hand, operational staff from some of the larger facilities have instructed at department operational skill training workshops.

Participation of operators in the certification areas of water distribution and (not shown) wastewater collection has been only at the class 1 and class 2 levels, because at these levels, the persons are typically also the water treatment plant operators. Water distribution system staff in larger communities are in a public works department and generally do not have regular contact with SERM.

8.3 Mandatory Operator Certification

Since the announcement of the government's intent to require certification of operators of water and wastewater works, an additional 100 operators had become certified under the Voluntary Program.

One year after the enactment of Mandatory Operator Certification, 92 operators have become certified in the new Mandatory Certification Program by criteria of education, experience and examination.

REFERENCES

1. Saskatchewan Environment and Resource Management; Water Works Regulations; 2000

2. Saskatchewan Environment and Resource Management; Environmental Management and Protection Act; 1990.

3. Saskatchewan Environment and Resource Management; Municipal Drinking Water Quality Objectives; 1996.

4. Saskatchewan Environment and Resource Management; A Guide To Waterworks Design; March, 1996.

5. Saskatchewan Environment and Resource Management; Municipal Drinking Water Quality Monitoring Guidelines; March, 1996.

6. Saskatchewan Environment and Resource Management; Surface Water Quality Objectives; December, 1995.

7. Saskatchewan Environment and Resource Management; Water/Wastewater Facilities (Facility Classification and Operator Certification); August, 1987.

8. Saskatchewan Environment and Resource Management; Turbidity Measurement; 1996.

9. Saskatchewan Environment and Resource Management; Guidelines for Chlorine Gas Use in Water and Wastewater Treatment; 1995.

10. Saskatchewan Environment and Resource Management; Reservoir Management; 1994.

11. Saskatchewan Environment and Resource Management; A Guide to Aquatic Nuisances and Their Control; April, 1993.

12. Saskatchewan Environment and Resource Management; WINDAT database.

13. Saskatchewan Environment and Resource Management; Municipal Drinking Water Quality; September, 1995.

14. Health Canada; Guidelines for Canadian Drinking Water Quality Sixth Edition; 1996.

15. Saskatchewan Environment and Resource Management; ESQUADAT database.

16. Statistics Canada - Population Information; 1996.

17. Certification Advisory Committee; Certification Program Review - Saskatchewan Water and Wastewater Operators; September, 1994.

18. Saskatchewan Environment and Resource Management; Discussion Paper - Training and Mandatory Certification of Water and Wastewater Facility Operators; August, 1995.

19. Health Canada; Guidelines for Canadian Drinking Water Quality - Fifth Edition; 1993.

APPENDIX 1 - SERM-Regulated Water Works

SYSTEM	TYPE	WT CLASS	MDS CLASS	WATER SOURCE TYPE
ABBEY	MUNICIPAL	WT1	WD1	GROUND
ABERDEEN	MUNICIPAL	WT1	WD1	GROUND
ABERNETHY	MUNICIPAL	WT1	WD1	GROUND
ADMIRAL	MUNICIPAL	WT1	WD1	GROUND
AIR RONGE	MUNICIPAL	WT2	WD1	SURFACE
ALAMEDA	MUNICIPAL	WT1	WD1	GROUND
ALBERTVILLE	MUNICIPAL	WT1	WD1	GROUND
ALIDA	MUNICIPAL	WT1	WD1	GROUND
ALLAN	MUNICIPAL		WD1	SURFACE
ALSASK	MUNICIPAL	WT1	WD1	GROUND
ALVENA	MUNICIPAL	WT1	WD1	GROUND
AMSTERDAM	MUNICIPAL	WT1	WD1	GROUND
ANEROID	MUNICIPAL	WT1	WD1	GROUND
ANNAHEIM	MUNICIPAL	WT1	WD1	SURFACE
ANTLER	MUNICIPAL	WT1	WD1	SURFACE
ARBORFIELD	MUNICIPAL	WT2	WD1	SURFACE
ARCHERWILL	MUNICIPAL	WT1	WD1	GROUND
ARCOLA	MUNICIPAL	WT1	WD1	GROUND
ARELEE	MUNICIPAL	WT1	WD1	GROUND
ARRAN	MUNICIPAL	WT1	WD1	GROUND
ASQUITH	MUNICIPAL	WT1	WD1	GROUND
ASSINIBOIA	MUNICIPAL	WT3	WD2	GROUND & SURFACE
ATWATER	MUNICIPAL			GROUND
AVONLEA	MUNICIPAL	WT2	WD1	SURFACE
AYLESBURY	MUNICIPAL	WT1	WD1	GROUND
AYLSHAM	MUNICIPAL	WT1	WD1	GROUND
BALCARRES	MUNICIPAL	WT1	WD1	GROUND
BALGONIE	MUNICIPAL	WT1	WD1	GROUND
BANGOR	MUNICIPAL	WT1	WD1	GROUND
BANKEND	MUNICIPAL	WT1	WD1	GROUND
BARRIER WATER GROUP	PRIVATE	WT1		GROUND
BATTLEFORD	MUNICIPAL	WT2	WD2	GROUND
BATTLEFORDS PROV.PK.	GOVERNMENT	WT1		GROUND
BEATTY	MUNICIPAL	WT1	WD1	SURFACE
BEAUBIER	MUNICIPAL	WT1	WD1	GROUND
BEAUVAL	MUNICIPAL	WT2	WD1	GROUND
BEECHY	MUNICIPAL	WT1	WD1	GROUND
BELLE PLAINE	MUNICIPAL		WD1	SURFACE
BELLEGARDE	MUNICIPAL	WT1	WD1	GROUND
BENGOUGH	MUNICIPAL	WT1	WD1	GROUND
BENSON	MUNICIPAL	WT2	WD1	SURFACE
BESANT CAMPGD.	GOVERNMENT	WT1	WD1	GROUND
BETHUNE	MUNICIPAL	WT2	WD1	SURFACE
BIENFAIT	MUNICIPAL	WT1	WD1	GROUND
BIG BEAVER	MUNICIPAL	WT1	WD1	GROUND
BIG RIVER	MUNICIPAL	WT2	WD1	GROUND
BIGGAR	MUNICIPAL	WT2	WD2	GROUND

BIRCH HILLS	MUNICIPAL	WT1	WD1	SURFACE
BIRSAY	MUNICIPAL	WT1	WD1	SURFACE
BLACKSTRAP PROV. PK.	GOVERNMENT	WT2		GROUND
BLADWORTH	MUNICIPAL	WT1	WD1	GROUND
BLAINE LAKE	MUNICIPAL	WT1	WD1	GROUND
BORDEN	MUNICIPAL	WT1	WD1	GROUND
BRACKEN	MUNICIPAL	WT2	WD1	SURFACE
BRADWELL	MUNICIPAL		WD1	SURFACE
BRANCEPETH	MUNICIPAL	WT1	WD1	SURFACE
BREDENBURY	MUNICIPAL	WT1	WD1	GROUND
BRIERCREST	MUNICIPAL	WT1	WD1	GROUND
BROADVIEW	MUNICIPAL	WT1	WD1	GROUND
BRODERICK	MUNICIPAL	WT1	WD1	SURFACE
BROOKSBY	MUNICIPAL	WT1	WD1	SURFACE
BROWNLEE	MUNICIPAL	WT1	WD1	GROUND
BRUNO	MUNICIPAL	WT1	WD1	GROUND
BUCHANAN	MUNICIPAL	WT1	WD1	GROUND & SURFACE
BUENA VISTA	MUNICIPAL	WT1	WD1	GROUND
BUFFALO NARROWS	MUNICIPAL	WT3	WD1	SURFACE
BUFFALO POUND PROV.PK.	GOVERNMENT			SURFACE
BULYEA	MUNICIPAL	WT1	WD1	GROUND
BURSTALL	MUNICIPAL	WT1	WD1	GROUND
CABRI	MUNICIPAL	WT2	WD1	SURFACE
CADILLAC	MUNICIPAL	WT1	WD1	GROUND
CALDER	MUNICIPAL	WT1	WD1	GROUND
CANDIAC	MUNICIPAL	WT1	WD1	GROUND
CANORA	MUNICIPAL	WT3	WD2	SURFACE
CANWOOD	MUNICIPAL	WT1	WD1	GROUND
CARIEVALE	MUNICIPAL	WT2	WD1	GROUND
CARLYLE	MUNICIPAL	WT2	WD1	GROUND
CARMEL	MUNICIPAL	WT1	WD1	GROUND
CARMICHAEL	MUNICIPAL	WT1	WD1	GROUND
CARNDUFF	MUNICIPAL	WT2	WD1	GROUND
CARON	MUNICIPAL	WT1	WD1	GROUND
CARONPORT	MUNICIPAL	WT1	WD1	GROUND
CARROT RIVER	MUNICIPAL	WT1	WD1	GROUND
Cedar Lodge - Blackstrap	PRIVATE	WT1	WD1	GROUND
CEDAR VILLA ESTATES	MUNICIPAL	WT2		SURFACE
CENTRAL BUTTE	MUNICIPAL	WT1	WD1	GROUND
CEYLON	MUNICIPAL	WT2	WD1	SURFACE
CHAMBERLAIN	MUNICIPAL	WT1	WD1	GROUND
CHAPLIN	MUNICIPAL	WT1	WD1	GROUND
CHELAN	MUNICIPAL	WT1	WD1	GROUND
CHOICELAND	MUNICIPAL	WT1	WD1	GROUND
CHURCHBRIDGE	MUNICIPAL	WT2	WD1	GROUND
CLAVET	MUNICIPAL		WD1	SURFACE
CLEARWATER L. REG.PK.	PRIVATE	WT1		GROUND
CLEMENCEAU	MUNICIPAL	WT1	WD1	SURFACE

CLIMAX	MUNICIPAL	WT1	WD1	GROUND
CODERRE	MUNICIPAL	WT1	WD1	GROUND
COLE BAY	MUNICIPAL	WT1	WD1	SURFACE
COLEVILLE	MUNICIPAL	WT1	WD1	GROUND
COLGATE	MUNICIPAL	WT2	WD1	SURFACE
COLONSAY	MUNICIPAL	WT1	WD1	GROUND
CONGRESS	MUNICIPAL	WT2	WD1	SURFACE
CONQUEST	MUNICIPAL	WT1	WD1	GROUND
CONSUL	MUNICIPAL	WT1	WD1	GROUND
COPPER SANDS T.C.	PRIVATE	WT1		GROUND
CORNING	MUNICIPAL	WT2	WD1	SURFACE
CORONACH	MUNICIPAL	WT1	WD1	GROUND
CORY PARK T.C.	PRIVATE	WT1	WD1	SURFACE
COTEAU BEACH	MUNICIPAL		WD1	SURFACE
COURVAL	MUNICIPAL	WT1	WD1	GROUND
CRAIK	MUNICIPAL	WT2	WD1	SURFACE
CRANE VALLEY	MUNICIPAL	WT1	WD1	GROUND
CRAVEN	MUNICIPAL	WT1	WD1	GROUND
CREELMAN	MUNICIPAL	WT2	WD1	SURFACE
CREIGHTON	MUNICIPAL	WT2	WD2	SURFACE
CROOKED RIVER	MUNICIPAL	WT1	WD1	SURFACE
CRYSTAL LAKE	MUNICIPAL	WT1	WD1	GROUND
CRYSTAL SPRINGS	MUNICIPAL	WT1	WD1	GROUND
CUDWORTH	MUNICIPAL	WT2	WD1	GROUND
CUMBERLAND HOUSE	MUNICIPAL	WT2	WD1	SURFACE
CUMMINS SUBDIVISION	MUNICIPAL			GROUND
CUPAR	MUNICIPAL	WT2	WD1	GROUND
CUT KNIFE	MUNICIPAL	WT2	WD1	GROUND
CYPRESS HILLS PROV.PK.	GOVERNMENT		WD1	GROUND
DALMENY	MUNICIPAL		WD1	SURFACE
DANA	MUNICIPAL	WT1	WD1	GROUND
DANIELSON PROV.PK.	GOVERNMENT	WT1		SURFACE
DAVIDSON	MUNICIPAL	WT2	WD1	GROUND & SURFACE
DAVIN	MUNICIPAL	WT1	WD1	GROUND
DEBDEN	MUNICIPAL	WT2	WD1	GROUND
DELISLE	MUNICIPAL	WT1	WD1	GROUND
DELMAS	MUNICIPAL	WT1	WD1	GROUND
DEMAINE	MUNICIPAL	WT1	WD1	GROUND
DENARE BEACH	MUNICIPAL	WT1	WD1	GROUND
DENHOLM	MUNICIPAL	WT1	WD1	GROUND
DENHOLM - B	MUNICIPAL		WD1	SURFACE
DENZIL	MUNICIPAL	WT1	WD1	GROUND
DILKE	MUNICIPAL	WT1	WD1	GROUND
DINSMORE	MUNICIPAL	WT2	WD1	GROUND
DODSLAND	MUNICIPAL	WT1	WD1	GROUND
DOMREMY	MUNICIPAL	WT2	WD1	GROUND
Dore Lake	MUNICIPAL			SURFACE
DORINTOSH	MUNICIPAL	WT1	WD1	GROUND

DOUGLAS PROV.PK.	GOVERNMENT	WT1		GROUND
DRAKE	MUNICIPAL	WT2	WD1	GROUND
DRINKWATER	MUNICIPAL		WD1	SURFACE
DUBUC	MUNICIPAL	WT1	WD1	GROUND
DUCK LAKE	MUNICIPAL	WT1	WD1	GROUND
DUFF	MUNICIPAL	WT1	WD1	GROUND
DUNDURN	MUNICIPAL	WT1	WD1	GROUND
DUVAL	MUNICIPAL	WT1	WD1	GROUND
DYSART	MUNICIPAL	WT1	WD1	GROUND
EARL GREY	MUNICIPAL	WT1	WD1	GROUND
EASTEND	MUNICIPAL	WT2	WD1	SURFACE
EATONIA	MUNICIPAL	WT1	WD1	GROUND
EBENEZER	MUNICIPAL	WT1	WD1	GROUND
ECHO VALLEY PROV.PK.	GOVERNMENT	WT1		GROUND
EDENWOLD	MUNICIPAL	WT2	WD1	GROUND & SURFACE
EDGELEY	MUNICIPAL	WT1	WD1	GROUND
ELBOW	MUNICIPAL	WT2	WD1	SURFACE
ELDERSLEY	MUNICIPAL	WT1	WD1	SURFACE
ELFROS	MUNICIPAL	WT2	WD1	SURFACE
ELROSE	MUNICIPAL	WT1	WD1	GROUND
ELSTOW	MUNICIPAL		WD1	SURFACE
ELSTOW N.RURAL WATER UTIL	PRIVATE			SURFACE
ELSTOW-B	MUNICIPAL		WD1	GROUND
EMERALD PARK	MUNICIPAL	WT1	WD1	GROUND
EMMA LK-MURRAY PT CMPGR	GOVERNMENT	WT1	WD1	GROUND
ENDEAVOUR	MUNICIPAL	WT1	WD1	GROUND
ENGLEFELD	MUNICIPAL	WT1	WD1	GROUND
ERNFOLD	MUNICIPAL	WT1		GROUND
ERWOOD	MUNICIPAL	WT1	WD1	SURFACE
ESTERHAZY	MUNICIPAL	WT2	WD2	GROUND
ESTEVAN	MUNICIPAL	WT3	WD2	SURFACE
ESTON	MUNICIPAL	WT2	WD1	SURFACE
EVESHAM	MUNICIPAL	WT1	WD1	GROUND
EYEBROW	MUNICIPAL	WT1	WD1	GROUND
FAIRHOLME	MUNICIPAL	WT1	WD1	GROUND
FAIRY GLEN	MUNICIPAL	WT1	WD1	SURFACE
FENWOOD	MUNICIPAL	WT2	WD1	GROUND
FERLAND	MUNICIPAL	WT1	WD1	GROUND
FILLMORE	MUNICIPAL	WT1	WD1	GROUND
FINDLATER	MUNICIPAL	WT1	WD1	GROUND
FLAMINGO T.C.	PRIVATE	WT1		GROUND
FLAXCOMBE	MUNICIPAL	WT1	WD1	GROUND
FLEMING	MUNICIPAL	WT2	WD1	SURFACE
FOAM LAKE	MUNICIPAL	WT3	WD2	GROUND & SURFACE
FORT QU'APPELLE	MUNICIPAL	WT2	WD2	GROUND
FOSSTON	MUNICIPAL	WT1	WD1	GROUND
FOX VALLEY	MUNICIPAL	WT1	WD1	GROUND
FRANCIS	MUNICIPAL	WT1	WD1	GROUND

FRENCHMAN BUTTE	MUNICIPAL	WT1	WD1	GROUND
FROBISHER	MUNICIPAL	WT1	WD1	GROUND
FRONTIER	MUNICIPAL	WT1	WD1	GROUND
FULDA	MUNICIPAL	WT1	WD1	GROUND
GARRICK	MUNICIPAL	WT1	WD1	GROUND
GERALD	MUNICIPAL	WT1	WD1	GROUND
GLADMAR	MUNICIPAL	WT1	WD1	GROUND
GLASLYN	MUNICIPAL	WT2	WD1	GROUND
GLEN EWEN	MUNICIPAL	WT2	WD1	GROUND
GLEN HARBOUR	MUNICIPAL	WT1	WD1	GROUND
GLENAVON	MUNICIPAL	WT1	WD1	GROUND
GLENSIDE	MUNICIPAL	WT1	WD1	GROUND
GOLDEN PRAIRIE	MUNICIPAL	WT1	WD1	GROUND
GOOD SPIRIT PROV.PK.	GOVERNMENT	WT1		SURFACE
GOODEVE	MUNICIPAL	WT2	WD1	SURFACE
GOODSOIL	MUNICIPAL	WT1	WD1	GROUND & SURFACE
GOVAN	MUNICIPAL	WT1	WD1	GROUND
GRAND COULEE	MUNICIPAL	WT1	WD1	SURFACE
GRANDVIEW BEACH	MUNICIPAL	WT1	WD1	GROUND
GRAVELBOURG	MUNICIPAL	WT2	WD1	SURFACE
GRAY	MUNICIPAL	WT1	WD1	GROUND
GRAYSON	MUNICIPAL	WT1	WD1	GROUND
GREEN LAKE	MUNICIPAL	WT1	WD1	GROUND
GREENSTREET	MUNICIPAL	WT1	WD1	GROUND
GREENWATER PROV.PK.	GOVERNMENT	WT2		SURFACE
GRENFELL	MUNICIPAL	WT2	WD1	GROUND & SURFACE
GRIFFIN	MUNICIPAL	WT1	WD1	SURFACE
GRONLID	MUNICIPAL	WT1	WD1	SURFACE
GUERNSEY	MUNICIPAL	WT2	WD1	SURFACE
GULL LAKE	MUNICIPAL	WT3	WD1	GROUND & SURFACE
HAFFORD	MUNICIPAL	WT2	WD1	GROUND
HAGEN	MUNICIPAL	WT2	WD1	SURFACE
HAGUE	MUNICIPAL	WT1	WD1	GROUND
HALBRITE	MUNICIPAL	WT2	WD1	GROUND
HANDEL	MUNICIPAL	WT1	WD1	GROUND
HANLEY	MUNICIPAL	WT2	WD1	GROUND & SURFACE
HARRIS	MUNICIPAL	WT1	WD1	GROUND
HAWARDEN	MUNICIPAL	WT1	WD1	GROUND
HAZEL DELL	MUNICIPAL	WT1	WD1	GROUND
HAZLET	MUNICIPAL	WT1	WD1	GROUND
HENDON	MUNICIPAL	WT1	WD1	GROUND
HERBERT	MUNICIPAL	WT2	WD1	SURFACE
HERSCHEL	MUNICIPAL		WD1	GROUND
HILLMOND	MUNICIPAL	WT1	WD1	GROUND
Hillside Water Co-op	MUNICIPAL	WT1	WD1	GROUND
HITCHCOCK	MUNICIPAL	WT2	WD1	GROUND
HODGEVILLE	MUNICIPAL	WT1	WD1	GROUND
HOEY	MUNICIPAL	WT1	WD1	GROUND

HOLDFAST	MUNICIPAL	WT1	WD1	GROUND
HUBBARD	MUNICIPAL	WT1	WD1	GROUND
HUDSON BAY	MUNICIPAL	WT2	WD2	SURFACE
HUMBOLDT	MUNICIPAL	WT3	WD2	GROUND & SURFACE
HYAS	MUNICIPAL	WT1	WD1	GROUND
ILE A LA CROSSE	MUNICIPAL	WT2	WD1	SURFACE
IMPERIAL	MUNICIPAL	WT1	WD1	GROUND
INDIAN HEAD	MUNICIPAL	WT2	WD2	GROUND
INSINGER	MUNICIPAL	WT1	WD1	GROUND
INVERMAY	MUNICIPAL	WT1	WD1	GROUND
ISLAND VIEW DRIVE	MUNICIPAL	WT1	WD1	GROUND
ITUNA	MUNICIPAL	WT2	WD1	GROUND
JANS BAY	MUNICIPAL	WT1	WD1	GROUND
JANSEN	MUNICIPAL	WT1	WD1	GROUND
JASMIN	MUNICIPAL	WT1	WD1	GROUND
JEDBURGH	MUNICIPAL	WT1	WD1	GROUND
KAMSACK	MUNICIPAL	WT3	WD2	SURFACE
KANNATA VALLEY	MUNICIPAL	WT1	WD1	GROUND
KAYVILLE	MUNICIPAL	WT1	WD1	GROUND
KEELER	MUNICIPAL	WT1	WD1	GROUND
KELLIHER	MUNICIPAL	WT1	WD1	GROUND
KELVINGTON	MUNICIPAL	WT1	WD1	GROUND
KENASTON	MUNICIPAL	WT1	WD1	GROUND
KENDAL	MUNICIPAL	WT1	WD1	GROUND
KENOSEE LAKE	MUNICIPAL	WT1	WD1	GROUND
KERROBERT	MUNICIPAL	WT2	WD1	GROUND & SURFACE
KETCHEN	MUNICIPAL	WT1	WD1	GROUND
KEYSTOWN	MUNICIPAL		WD1	SURFACE
KHEDIVE	MUNICIPAL	WT1	WD1	GROUND
KILLALY	MUNICIPAL	WT1	WD1	GROUND
KINCAID	MUNICIPAL	WT1	WD1	SURFACE
KINDERSLEY	MUNICIPAL	WT3	WD2	GROUND & SURFACE
KINISTINO	MUNICIPAL	WT1	WD1	GROUND
KIPABISKUA REG. PK.	PRIVATE		WD1	GROUND
KIPLING	MUNICIPAL	WT2	WD1	GROUND & SURFACE
KRONAU	MUNICIPAL	WT1	WD1	SURFACE
KUROKI	MUNICIPAL	WT2	WD1	SURFACE
KYLE	MUNICIPAL	WT1	WD1	GROUND
LA LOCHE	MUNICIPAL	WT1	WD2	GROUND
LA RONGE	MUNICIPAL	WT1	WD2	SURFACE
LAC VERT	MUNICIPAL	WT1	WD1	GROUND
LAFLECHE	MUNICIPAL	WT2	WD1	SURFACE
LAIRD	MUNICIPAL	WT2	WD1	GROUND & SURFACE
LAKE ALMA	MUNICIPAL	WT1	WD1	GROUND
LAKE LENORE	MUNICIPAL	WT2	WD1	GROUND & SURFACE
LAKEVIEW BEACH	MUNICIPAL	WT1	WD1	SURFACE
LAMPMAN	MUNICIPAL	WT1	WD1	GROUND
LANCER	MUNICIPAL	WT2	WD1	GROUND

LANDIS	MUNICIPAL	WT1	WD1	GROUND
LANG	MUNICIPAL	WT1	WD1	GROUND
LANGBANK	MUNICIPAL	WT1	WD1	GROUND
LANGENBURG	MUNICIPAL	WT2	WD1	GROUND
LANGHAM	MUNICIPAL	WT1	WD1	GROUND
LANIGAN	MUNICIPAL	WT2	WD1	SURFACE
LANZ POINT	NON POTABLE	WT1	WD1	SURFACE
LAPORTE	MUNICIPAL	WT1	WD1	GROUND
LASHBURN	MUNICIPAL	WT2	WD1	GROUND
LAURIER	MUNICIPAL		WD1	SURFACE
LEADER	MUNICIPAL	WT1	WD1	SURFACE
LEASK	MUNICIPAL	WT2	WD1	GROUND
LEBRET	MUNICIPAL	WT1	WD1	GROUND
LEMBERG	MUNICIPAL	WT1	WD1	GROUND
LEOVILLE	MUNICIPAL	WT2	WD1	GROUND
LEROSS	MUNICIPAL	WT1	WD1	GROUND
LEROY	MUNICIPAL	WT1	WD1	GROUND
LESLIE	MUNICIPAL	WT1	WD1	GROUND
LESTOCK	MUNICIPAL	WT1	WD1	GROUND
LIBERTY	MUNICIPAL	WT2	WD1	SURFACE
LIMERICK	MUNICIPAL	WT2	WD1	SURFACE
LINTLAW	MUNICIPAL	WT1	WD1	GROUND
LIPTON	MUNICIPAL	WT1	WD1	GROUND
LIVELONG	MUNICIPAL	WT1	WD1	GROUND
LLOYDMINSTER	MUNICIPAL	WT3	WD3	SURFACE
LONE ROCK	MUNICIPAL	WT1	WD1	GROUND
LOON LAKE	MUNICIPAL	WT2	WD1	GROUND
LOREBURN	MUNICIPAL	WT1	WD1	GROUND
LOVE	MUNICIPAL	WT1	WD1	GROUND
LUCKY LAKE	MUNICIPAL	WT2	WD1	GROUND & SURFACE
LUMSDEN	MUNICIPAL		WD1	GROUND
LUMSDEN BEACH	MUNICIPAL	WT1	WD1	GROUND
LUSELAND	MUNICIPAL	WT1	WD1	GROUND
MACKLIN	MUNICIPAL	WT1	WD1	GROUND
MACNUTT	MUNICIPAL	WT1	WD1	GROUND
MACOUN	MUNICIPAL	WT1	WD1	GROUND
MACRORIE	MUNICIPAL	WT1	WD1	GROUND
MAIDSTONE	MUNICIPAL	WT1	WD1	GROUND
MAJOR	MUNICIPAL	WT1	WD1	GROUND
MAKWA	MUNICIPAL	WT1	WD1	GROUND
MANITOU BEACH	MUNICIPAL		WD1	GROUND
MANKOTA	MUNICIPAL	WT2	WD1	GROUND & SURFACE
MANOR	MUNICIPAL	WT1	WD1	GROUND
MAPLE CREEK	MUNICIPAL	WT1	WD2	GROUND
MARCELIN	MUNICIPAL	WT2	WD1	GROUND
MARCHWELL	MUNICIPAL	WT1	WD1	GROUND
MARENGO	MUNICIPAL	WT1	WD1	GROUND
MARGO	MUNICIPAL	WT2	WD1	GROUND

MARKINCH	MUNICIPAL	WT1	WD1	GROUND
MARQUIS	MUNICIPAL		WD1	SURFACE
MARSDEN	MUNICIPAL	WT2	WD1	GROUND
MARSHALL	MUNICIPAL	WT1	WD1	GROUND
MARTENSVILLE	MUNICIPAL		WD2	SURFACE
MARYFIELD	MUNICIPAL	WT2	WD1	GROUND
MARYSBURG	MUNICIPAL	WT2	WD1	SURFACE
MAYFAIR	MUNICIPAL	WT2	WD1	GROUND & SURFACE
MAYMONT	MUNICIPAL	WT2	WD1	GROUND
MAZENOD	MUNICIPAL	WT2	WD1	SURFACE
MCLEAN	MUNICIPAL	WT1	WD1	GROUND
MCTAGGART	MUNICIPAL	WT1	WD1	GROUND & SURFACE
MEACHAM	MUNICIPAL	WT1	WD1	GROUND
MEADOW LAKE	MUNICIPAL	WT2	WD2	SURFACE
MEADOW LK P-LAC DES ILES	GOVERNMENT	WT1	WD1	SURFACE
MEATH PARK	MUNICIPAL	WT1	WD1	GROUND
MEDSTEAD	MUNICIPAL	WT1	WD1	GROUND
MEETING LK. ESTATES	PRIVATE	WT1		SURFACE
MEETING LK. REG.PK.	PRIVATE	WT1		GROUND
MELFORT	MUNICIPAL	WT3	WD2	SURFACE
MELVILLE	MUNICIPAL	WT4	WD2	GROUND & SURFACE
MENDHAM	MUNICIPAL	WT1	WD1	GROUND & SURFACE
MEOTA	MUNICIPAL	WT2	WD1	SURFACE
MEYRONNE	MUNICIPAL	WT1	WD1	GROUND
MIDALE	MUNICIPAL	WT2	WD1	GROUND & SURFACE
MIDDLE LAKE	MUNICIPAL	WT1	WD1	GROUND
MIDWEST CAMPGD.	PRIVATE	WT1	WD1	GROUND
MIKADO	MUNICIPAL	WT2	WD1	SURFACE
MILDEN	MUNICIPAL	WT1	WD1	GROUND
MILESTONE	MUNICIPAL	WT2	WD1	GROUND
MINOWUKAW CAMPGD.	GOVERNMENT			SURFACE
MINTON	MUNICIPAL	WT1	WD1	GROUND
MISTATIM	MUNICIPAL	WT1	WD1	SURFACE
MONTMARTRE	MUNICIPAL	WT2	WD1	SURFACE
MOOSE JAW	MUNICIPAL	WT4	WD3	SURFACE
MOOSE MOUNTAIN PROV.PK.	GOVERNMENT			GROUND
MOOSOMIN	MUNICIPAL	WT2	WD2	GROUND
MORSE	MUNICIPAL	WT1	WD1	GROUND
MORTLACH	MUNICIPAL	WT2	WD1	GROUND
MOSSBANK	MUNICIPAL	WT1	WD1	GROUND
MOZART	MUNICIPAL	WT1	WD1	GROUND
MUENSTER	MUNICIPAL	WT2	WD1	SURFACE
NAICAM	MUNICIPAL	WT2	WD1	GROUND
NEILBURG	MUNICIPAL	WT2	WD1	GROUND
NEUDORF	MUNICIPAL		WD1	GROUND
NICKLE L. REG.PK.	PRIVATE	WT2		SURFACE
NIPAWIN	MUNICIPAL	WT2	WD2	GROUND
NOKOMIS	MUNICIPAL		WD1	GROUND

NORQUAY	MUNICIPAL	WT1	WD1	GROUND
NORTH BATTLEFORD	MUNICIPAL	WT3	WD2	GROUND & SURFACE
NORTH BAY T.C.	PRIVATE	WT1		GROUND
NORTH PORTAL	MUNICIPAL	WT1	WD1	GROUND
NUT MOUNTAIN	MUNICIPAL	WT1	WD1	SURFACE
ODESSA	MUNICIPAL	WT1	WD1	GROUND
OGEMA	MUNICIPAL	WT1	WD1	GROUND
ORMISTON	MUNICIPAL	WT1	WD1	GROUND
OSAGE	MUNICIPAL	WT1	WD1	GROUND & SURFACE
OSLER	MUNICIPAL		WD1	SURFACE
OUNGRE	MUNICIPAL		WD1	GROUND
OUTLOOK	MUNICIPAL	WT2	WD2	SURFACE
OXBOW	MUNICIPAL	WT1	WD1	GROUND
PADDOCKWOOD	MUNICIPAL	WT1	WD1	GROUND
PALMER	MUNICIPAL	WT2	WD1	SURFACE
PAMBRUN	MUNICIPAL	WT1	WD1	GROUND
PANGMAN	MUNICIPAL	WT1	WD1	GROUND
PARADISE HILL	MUNICIPAL	WT2	WD1	GROUND
PARKBEG	MUNICIPAL	WT1	WD1	SURFACE
PARRY	MUNICIPAL	WT1	WD1	GROUND
PATHLOW	MUNICIPAL	WT1	WD1	GROUND
PATUANAK	MUNICIPAL			GROUND
PAYNTON	MUNICIPAL	WT1	WD1	GROUND
PEEBLES	MUNICIPAL	WT1	WD1	GROUND
PELICAN NARROWS	MUNICIPAL	WT1	WD1	SURFACE
PELICAN POINT	MUNICIPAL	WT1	WD1	SURFACE
PELLY	MUNICIPAL	WT1	WD1	GROUND
PENNANT	MUNICIPAL	WT1	WD1	GROUND
PENSE	MUNICIPAL		WD1	SURFACE
PENZANCE	MUNICIPAL	WT1	WD1	GROUND
PERDUE	MUNICIPAL	WT1	WD1	GROUND
PIAPOT	MUNICIPAL	WT1	WD1	GROUND
PIERCELAND	MUNICIPAL	WT1	WD1	GROUND
PIKE LAKE PROV.PK.	GOVERNMENT	WT1		GROUND
PILGER	MUNICIPAL	WT1	WD1	GROUND & SURFACE
PINEHOUSE LAKE	MUNICIPAL	WT1	WD1	SURFACE
PLEASANTDALE	MUNICIPAL	WT1	WD1	GROUND
PLENTY	MUNICIPAL	WT1	WD1	GROUND
PLUNKETT	MUNICIPAL	WT1	WD1	GROUND
PONDEROSA T.C.	PRIVATE	WT1	WD1	GROUND
PONTEIX	MUNICIPAL	WT1	WD1	GROUND
PORCUPINE PLAIN	MUNICIPAL	WT1	WD1	GROUND
PRAIRIE RIVER	MUNICIPAL	WT1	WD1	GROUND & SURFACE
PREECEVILLE	MUNICIPAL	WT1	WD1	GROUND
PRELATE	MUNICIPAL	WT1	WD1	GROUND
PRIMATE	MUNICIPAL	WT1	WD1	GROUND
PRINCE ALBERT	MUNICIPAL	WT4	WD3	SURFACE
PRUD'HOMME	MUNICIPAL	WT1	WD1	GROUND

PUNNICHY	MUNICIPAL	WT1	WD1	GROUND
QU'APPELLE	MUNICIPAL	WT1	WD1	GROUND
QUILL LAKE	MUNICIPAL	WT1	WD1	GROUND
QUINTON	MUNICIPAL	WT1	WD1	GROUND
RABBIT LAKE	MUNICIPAL	WT1	WD1	GROUND
RADISSON	MUNICIPAL	WT1	WD1	GROUND
RADVILLE	MUNICIPAL	WT2	WD1	GROUND & SURFACE
RAMA	MUNICIPAL	WT2	WD1	SURFACE
RAYMORE	MUNICIPAL	WT2	WD1	GROUND
READLYN	MUNICIPAL	WT1	WD1	GROUND
REDBERRY LK. REG.PK.	PRIVATE	WT1		GROUND
REDVERS	MUNICIPAL	WT2	WD1	GROUND
REGINA	MUNICIPAL		WD4	GROUND & SURFACE
REGINA BEACH	MUNICIPAL		WD1	GROUND
REGINA CORRECTIONAL	GOVERNMENT	WT1	WD1	GROUND
REGINA N.IND.SUB.	MUNICIPAL		WD1	GROUND
RHEIN	MUNICIPAL	WT2	WD1	GROUND
RICETON	MUNICIPAL	WT1	WD1	GROUND
RICHMOUND	MUNICIPAL	WT1	WD1	GROUND
RIDGEDALE	MUNICIPAL	WT1	WD1	SURFACE
RIVERHURST	MUNICIPAL	WT2	WD1	SURFACE
RIVERSIDE	MUNICIPAL		WD1	SURFACE
RIVERSIDE ESTATES	MUNICIPAL	WT1	WD1	SURFACE
ROCANVILLE	MUNICIPAL	WT2	WD1	GROUND
ROCHE PERCEE	MUNICIPAL		WD1	GROUND
ROCKGLEN	MUNICIPAL	WT2	WD1	GROUND
ROSE VALLEY	MUNICIPAL	WT1	WD1	GROUND
ROSETOWN	MUNICIPAL	WT3	WD2	GROUND
ROSTHERN	MUNICIPAL	WT2	WD2	GROUND
ROULEAU	MUNICIPAL	WT1	WD1	GROUND
ROWANS RAVINE PROV.PK.	GOVERNMENT	WT1	WD1	GROUND
RUDDELL	MUNICIPAL	WT1	WD1	GROUND
RUSH LAKE	MUNICIPAL	WT1	WD1	GROUND
SALTCOATS	MUNICIPAL	WT1	WD1	GROUND
SALVADOR	MUNICIPAL	WT2	WD1	GROUND
SANDY BAY	MUNICIPAL	WT1	WD1	SURFACE
SANDY BAY CAMPGD.	GOVERNMENT	WT1		GROUND
SARNIA BEACH	MUNICIPAL	WT1	WD1	SURFACE
SASKATOON	MUNICIPAL	WT4	WD4	SURFACE
SCEPTRE	MUNICIPAL	WT1	WD1	GROUND
SCOTT	MUNICIPAL	WT1	WD1	GROUND
SCOUT LAKE	MUNICIPAL	WT1	WD1	GROUND
SEDLEY	MUNICIPAL	WT1	WD1	GROUND
SEMANS	MUNICIPAL	WT2	WD1	GROUND & SURFACE
SENLAC	MUNICIPAL	WT1	WD1	GROUND
SHAUNAVON	MUNICIPAL	WT1	WD2	GROUND
SHEHO	MUNICIPAL	WT1	WD1	GROUND
SHELLBROOK	MUNICIPAL	WT2	WD1	GROUND

SHIELDS	MUNICIPAL	WT1	WD1	SURFACE
SILTON	MUNICIPAL	WT1	WD1	GROUND
SIMPSON	MUNICIPAL	WT1	WD1	GROUND
SINTALUTA	MUNICIPAL	WT1	WD1	GROUND
SMEATON	MUNICIPAL	WT1	WD1	GROUND
SMILEY	MUNICIPAL	WT1	WD1	GROUND
SNOWDEN	MUNICIPAL	WT1	WD1	GROUND
SOUTHEY	MUNICIPAL	WT1	WD1	GROUND
SOVEREIGN	MUNICIPAL	WT1	WD1	GROUND
SPALDING	MUNICIPAL	WT1	WD1	GROUND
SPEERS	MUNICIPAL	WT1	WD1	GROUND
SPIRITWOOD	MUNICIPAL	WT1	WD1	GROUND
SPRING VALLEY	MUNICIPAL	WT1	WD1	GROUND & SURFACE
SPRING VALLEY -- B	MUNICIPAL		WD1	
SPRINGSIDE	MUNICIPAL	WT1	WD1	GROUND
SPRUCE LAKE	MUNICIPAL	WT1	WD1	SURFACE
SPY HILL	MUNICIPAL	WT1	WD1	GROUND
ST. BENEDICT	MUNICIPAL	WT1	WD1	GROUND
ST. BRIEUX	MUNICIPAL	WT1	WD1	GROUND
ST. GEORGE'S HILL	MUNICIPAL			GROUND
ST. GREGOR	MUNICIPAL	WT1	WD1	GROUND
ST. ISIDORE DE BELLEVUE	MUNICIPAL		WD1	SURFACE
ST. LOUIS	MUNICIPAL	WT1	WD1	SURFACE
ST. VICTOR	MUNICIPAL	WT1	WD1	GROUND
ST. WALBURG	MUNICIPAL	WT2	WD1	GROUND
STANLEY MISSION	MUNICIPAL	WT1	WD1	SURFACE
STAR CITY	MUNICIPAL	WT2	WD1	GROUND
STARLITE T.C.	PRIVATE	WT1		GROUND
STENEN	MUNICIPAL	WT1	WD1	GROUND
STEWART VALLEY	MUNICIPAL	WT1	WD1	GROUND
STOCKHOLM	MUNICIPAL	WT1	WD1	GROUND
STOCKHOLM	MUNICIPAL	WT1	WD1	GROUND
STONY BEACH	MUNICIPAL		WD1	SURFACE
STONY RAPIDS	MUNICIPAL	WT1	WD1	GROUND
STORTHOAKS	MUNICIPAL	WT1	WD1	GROUND
STOUGHTON	MUNICIPAL	WT1	WD1	GROUND
STRASBOURG	MUNICIPAL	WT1	WD1	GROUND
STRONGFIELD	MUNICIPAL	WT1	WD1	GROUND
STURGIS	MUNICIPAL	WT1	WD1	GROUND
SUNNYSIDE COTT.OWN.	PRIVATE			SURFACE
SUNSET ESTATES T.C.	PRIVATE			SURFACE
SWAN PLAIN	MUNICIPAL	WT1	WD1	GROUND
SWIFT CURRENT	MUNICIPAL	WT3	WD3	SURFACE
SYLVANIA	MUNICIPAL	WT1	WD1	GROUND
TADMORE	MUNICIPAL	WT1	WD1	GROUND
TANTALLON	MUNICIPAL	WT1	WD1	GROUND
THEODORE	MUNICIPAL	WT1	WD1	GROUND
THODE	MUNICIPAL	WT1	WD1	SURFACE

Timber Bay	MUNICIPAL			GROUND
TISDALE	MUNICIPAL	WT2	WD2	GROUND
TOGO	MUNICIPAL	WT1	WD1	GROUND
TOMPKINS	MUNICIPAL	WT1	WD1	GROUND
TORQUAY	MUNICIPAL	WT2	WD1	GROUND
TRAMPING LAKE	MUNICIPAL	WT1	WD1	GROUND
TROSSACHS	MUNICIPAL	WT2	WD1	SURFACE
TUFFNELL	MUNICIPAL	WT1	WD1	GROUND
TURNOR LAKE	MUNICIPAL	WT1	WD1	GROUND
TURTLEFORD	MUNICIPAL	WT2	WD1	GROUND
TUXFORD	MUNICIPAL		WD1	SURFACE
UNITY	MUNICIPAL	WT2	WD2	GROUND
URANIUM CITY	MUNICIPAL	WT1	WD1	SURFACE
VALPARAISO	MUNICIPAL	WT1	WD1	GROUND & SURFACE
VANGUARD	MUNICIPAL	WT2	WD1	GROUND
VANSCOY	MUNICIPAL	WT1	WD1	SURFACE
VAWN	MUNICIPAL	WT1	WD1	GROUND
VEREGIN	MUNICIPAL	WT1	WD1	GROUND
VERWOOD	MUNICIPAL	WT1	WD1	GROUND
VIBANK	MUNICIPAL	WT1	WD1	GROUND
VICEROY	MUNICIPAL	WT1	WD1	GROUND
VISCOUNT	MUNICIPAL	WT2	WD1	SURFACE
VONDA	MUNICIPAL	WT1	WD1	GROUND
WADENA	MUNICIPAL	WT2	WD2	GROUND
WAKAW	MUNICIPAL	WT1	WD1	SURFACE
WALDECK	MUNICIPAL	WT1	WD1	GROUND
WALDHEIM	MUNICIPAL	WT1	WD1	GROUND
WAPELLA	MUNICIPAL	WT2	WD1	GROUND
WARMAN	MUNICIPAL		WD2	SURFACE
WASECA	MUNICIPAL	WT2	WD1	GROUND & SURFACE
WATROUS	MUNICIPAL	WT2	WD2	GROUND
WATSON	MUNICIPAL	WT2	WD1	GROUND
WAWOTA	MUNICIPAL	WT2	WD1	GROUND
WEBB	MUNICIPAL	WT1	WD1	GROUND
WEEKES	MUNICIPAL	WT1	WD1	SURFACE
WEIRDALE	MUNICIPAL	WT1	WD1	GROUND
WELDON	MUNICIPAL		WD1	SURFACE
WELWYN	MUNICIPAL	WT2	WD1	GROUND
WEYAKWIN	MUNICIPAL	WT1	WD1	GROUND
WEYBURN	MUNICIPAL	WT3	WD2	GROUND & SURFACE
WHITE BEAR	MUNICIPAL		WD1	SURFACE
WHITE CITY	MUNICIPAL	WT1	WD1	GROUND
WHITE FOX	MUNICIPAL	WT1	WD1	GROUND
WHITE SPRUCE	GOVERNMENT	WT2	WD1	GROUND
WHITEWOOD	MUNICIPAL	WT2	WD1	GROUND
WILCOX	MUNICIPAL	WT1	WD1	GROUND
WILKIE	MUNICIPAL	WT1	WD2	GROUND
WILLOW BUNCH	MUNICIPAL	WT1	WD1	GROUND

WILLOWBROOK	MUNICIPAL	WT1	WD1	GROUND
WINDTHORST	MUNICIPAL	WT1	WD1	GROUND
WISETON	MUNICIPAL	WT1	WD1	GROUND
WISHART	MUNICIPAL	WT1	WD1	GROUND
WOLLASTON LAKE	MUNICIPAL	WT1	WD1	SURFACE
WOLSELEY	MUNICIPAL	WT1	WD1	GROUND
WOOD MOUNTAIN	MUNICIPAL	WT1	WD1	GROUND
WOODROW	MUNICIPAL	WT1	WD1	GROUND
WROXTON	MUNICIPAL	WT1	WD1	GROUND
WSUREWSS EMERALD PK	GOVERNMENT			
WYNYARD	MUNICIPAL	WT2	WD2	GROUND
YARBO	MUNICIPAL	WT2	WD1	GROUND
YELLOW CREEK	MUNICIPAL	WT1	WD1	GROUND
YELLOW GRASS	MUNICIPAL	WT1	WD1	GROUND
YORKTON	MUNICIPAL	WT2	WD3	GROUND
YOUNG	MUNICIPAL	WT1	WD1	GROUND
ZEALANDIA	MUNICIPAL	WT1	WD1	GROUND
ZELMA	MUNICIPAL	WT1	WD1	GROUND
ZENON PARK	MUNICIPAL	WT1	WD1	GROUND